REPORT RESUMES

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OREGON STATEWIDE STUDY OF SYSTEMATIC VOCATIONAL EDUCATION PLANNING, IMPLEMENTATION, EVALUATION. PHASE I--MANPOWER NEEDS, DATA COLLECTION DEVICES AND OCCUPATIONAL CLUSTERS. FINAL REPORT.

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DESCRIPTORS- *VOCATIONAL EDUCATION, *PROGRAM PLANNING, *PROGRAM EVALUATION, *INFORMATION NEEDS, *DATA COLLECTION, HUMAN RESOURCES, EMPLOYMENT OPPORTUNITIES, OCCUPATIONAL CLUSTERS, QUESTIONNAIRES, STUDENTS, DROPOUTS, EMPLOYEES, EMPLOYERS, HIGH SCHOOLS, COMMUNITY COLLEGES, MANPOWER NEEDS, INFORMATION SOURCES, PROPRIETARY SCHOOLS, TASK ANALYSIS, GUIDELINES, OREGON,

THE OBJECTIVE OF THE STUDY WAS TO DEVELOP A DYNAMIC SYSTEM FOR INPUTING DATA ON HUMAN AND OCCUPATIONAL RESOURCES FOR USE IN DEVELOPING VOCATIONAL EDUCATION PROGRAMS TO MEET CURRENT AND FUTURE OCCUPATIONAL NEEDS. IN THE FIRST OF FOUR PHASES, THE OBJECTIVES WERE TO DEVELOP (1) DATA GATHERING INSTRUMENTS DESIGNED TO CONTINUOUSLY ASSESS HUMAN RESOURCES, EMPLOYMENT OPPORTUNITIES, AND EDUCATIONAL PROGRAMS, (2) A SYSTEM FOR ASSESSING JOB OPPORTUNITIES WHICH CLUSTER REQUIRED JOB SKILLS AND MENTAL PROCESSES, AND (3) MANUALS OF PROCEDURE FOR USE BY FIELD PERSONNEL IN ADMINISTERING DATA GATHERING INSTRUMENTS AND EMPLOYING THE CLUSTERING SYSTEM. SURVEY QUESTIONNAIRES TO BE USED WITH STUDENTS, DROPOUTS, EMPLOYEES, EMPLOYERS, SECONDARY SCHOOL VOCATIONAL PROGRAMS, COMMUNITY COLLEGE VOCATIONAL PROGRAMS, AND PROPRIETARY SCHOOLS WERE DEVELOPED, FIELD TESTED, ANALYZED, AND MODIFIED. A TWO-DIMENSIONAL CLUSTERING SYSTEM WHICH COMBINED WORKER FUNCTIONS AND PROCESSES WAS DEVELOPED. JOBS IN OCCUPATIONAL AREAS REPRESENTING MECHANICAL, ELECTRICAL, AND SYMBOLIC SKILLS WERE USED AS SAMPLES IN DEVELOPING TASK DESCRIPTIONS AND NUMERICAL LOADINGS FROM WHICH CLUSTERS WERE FORMED. GUIDELINES WERE PREPARED FOR ADMINISTERING DATA GATHERING INSTRUMENTS AND EMPLOYING THE CLUSTERING SYSTEM. INCLUDED ARE (1) DETAILED DESCRIPTIONS OF INSTRUMENT DEVELOPMENT, (2) A BIBLIOGRAPHY, AND (3) EXTENSIVE APPENDIXES CONTAINING RELATED INFORMATION, AN INSTRUMENT ANALYSIS, THE GUIDE FOR ADMINISTERING INSTRUMENTS, THE INSTRUMENTS, A SUPPLEMENT TO INSTRUMENT UTILIZATION, TASK DESCRIPTIONS, AND CLASSIFICATION LOADINGS. (JM)

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FINAL REPORT

Project No. 5-0017
Contract No. OE-5-85-049

Oregon Statewide Study of Systematic Vocational Education Planning, Implementation, Evaluation

Phase I - Manpower Needs, Data Collection Devices and Occupation Clusters

September 1967

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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Oregon Statewide Study of
Systematic Vocational Education Planning,
Implementation, Evaluation

Phase I - Manpower Needs, Data Collection Devices and Occupation Clusters

Project No. 5-0017
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State Department of Education
Leon P. Minear, Superintendent of
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Salem, Oregon

September, 1967

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Chapter I

Introduction

Problem

Vocational and technical education has assumed a new importance in the United States. The shortage of workers in many technical, skilled and semi-skilled jobs; the increased unemployment and under-employment of youth; the need for retraining of workers displaced by automation; the continuing education required of workers confronted with new technological devices; the rising demand for improved education opportunities both at the secondary and post-secondary levels all are factors which force a new look at this nation's occupational education.

The broad aim of this study was to develop articulated programs of vocational education at the non-baccalaureate degree level designed to reduce the discrepancy that presently exists between vocational training programs and skill requirements of emerging jobs. Planning and implementing such training programs requires a system for continuously assessing human resources employment opportunities and vocational educational training programs, as well as a means for determining what current and newly emerging jobs form into common clusters. Thus the objective of the study was to develop a dynamic system for inputing data on human and occupational resources such that vocational education programs could be developed to meet current and future occupational needs.

However, planning programs of vocational and technical education, in light of the above problems to prepare individuals for employment in a changed and changing society of technological work, is an increasingly complex problem. For an example, much concern over unemployment has been based on the realization that existing labor force skills do not match skill demands of emerging job clusters. More and more workers are displaced each year by automation and the difficulty of absorbing these workers in the labor market increases. Grant Venn, commenting on the impact of technology, says that

> Technology, as it destroys jobs, also creates new ones; for example, while elevator operators are losing their jobs to automatic elevators, new jobs are created in the design, building, sale, installation, and servicing of the new equipment. But the newly created jobs are not likely to be filled by the displaced workers unless they have the educational potential and training opportunities to meet the requirements of the new job. The problem, then is one of distribution of the labor force, of matching job requirements and the potential people to meet them. (Venn, 1964 pp. 19-20)

The gap between preparation for job entry and skill requirements of new jobs is expected to widen. The need to keep study programs up to date and the necessity of knowing what kind and how many workers should be in training to serve the needs of new technology is becoming acute. Willard Wirtz summarized this point as follows:

> What this means in terms of educational needs is obvious. We simply cannot any longer affort to let boys and girls leave the educational system unprepared to use their minds as well as their muscles. We must, in one way or another, see to it that they have what today's - and tomorrow's - labor market requires. The margin for educational error or failure, which is what the unskilled jobs in the old work force constituted, has been taken up by the machine. (Wirtz, 1963, p.2)

What we face in preparing workers to meet the new technology is change. While we have always been aware of the occurrance of changes in the occupational structure, it seems that only recently have educational leaders become aware of the inadequacy of the model for assessing human resources, job opportunities, and vocational education programs in order to keep up with preparing workers to meet changes in occupations. What is now taking place for which we are unprepared to meet, is the change occurring in the rate of change in the new technology; that is, the exponential pace in the rate at which new job functions and relationships are being modified and replaced. Unless we gear up the means of planning for vocational and technical education programs to keep pace with the changes brought on by this new technology, its potential for new change and the rate at which change is taking place, we will be expecting newly trained workers to meet jobs different only in degree when instead we should be planning for them to meet jobs, as Donald Michael puts it, "so different in degree as to be a profound difference in kind." (1962, p.5) These changes are breaking down the old industrial trend toward more and more people doing either simple or undifferentiated chores. The increasing diversity in today's technologically changing occupations is demanding workers of very diverse, highly specialized competencies.

However, the full impact of the new technology on the labor market has not been recognized by society at large. As Venn says, "the instances of technological unemployment are like the cap of an iceberg; the difficulty of appreciating what is below lures many into believing we can sail blithely ahead without changing course." (Venn, 1964, p.5) Unfortunately, we have been told over and over that for every job displaced by automation, two newly created jobs will be filled by the very workers who have been displaced by automation; but also, unfortunately we find that their training is usually inappropriate. This reasoning is not limited to the general public but is also voiced by many educators and public leaders. Such persons fail to realize that the forces of technology are already upon us and must be dealt with immediately if we are to avoid serious economic and social disruption of the entire country.

Vocational education programs are needed which will equip youth, displaced workers, and workers seeking additional training with the knowledge and skills required to fill changing and emerging job opportunities. An issue of major concern to government, education, and industry is how to develop non-baccalaureate programs of technical and vocational education which can be changed rapidly enough and often enough to meet the needs of a dynamic society. (Brookover, 1963; Davis, 1962; Drucker, 1959)

Thus far, efforts to come to grips with this problem have been directed toward current occupational demands and the existing labor force rather than oriented toward anticipated occupational opportunities and the potential labor force. The real need appears to lie in a continuing program which is future-oriented in terms of vocational education planning, plan implementation, and program evaluation to close the gap between preparation and employment. There is need for projection of manpower needs so schools can develop articulated programs.

Review of Related Research

A search of related literature suggests that efforts so far have been directed mainly to studies of particular vocational education programs, to regional surveys of current manpower needs, and to identification of characteristics of selected workers. Little research has been done to identify anticipated occupational demands and job clusters, and to test effectiveness of vocational education programs attempting to prepare available human resources for potential job opportunities emerging in job clusters.

One statewide study conducted in Minnesota attempted to determine where additional schools might be needed, and to what extent existing facilities might be expanded. (Van Tries, 1964) The study surveyed all area vocational technical schools to identify geographic distribution of schools in regard to population, enrollment of students, and expansion needs. This study suggests the feasibility of a statewide survey; however, it focused primarily on the question of where and how many schools were needed, rather than on the development, implementation, and evaluation of programs aimed at preparing workers for entry into actual and anticipated jobs. The study indicated that some consideration was taken of anticipated needs as far as recommendations were received from advisory committees of business, trade, and industry. This aspect parallels the seminar approach used in Oregon. It was felt by the Oregon Coordinating Committee on Vocational Planning that although this approach had merit, it did not go far enough to meet the needs of this study.

Another statewide study undertaken in Illinois was designed to examine unemployment in the State, determine characteristics and causes, and assess techniques used to meet the problem. (Illinois, 1962a, 1962b) Results clearly indicate the extensive data which can be gathered through survey on a statewide scale, and document the feasibility of gathering projected data. Findings from the study included data on unemployment in Illinois, years of schooling of unemployment, available civilian labor force, unemployed persons by industry attachment, projected percent increase in rates of unemployment, illiteracy rates, and percent of job seekers willing to move to find a job. A major limitation of the Illinois study was that it focused on one segment of the total population: the unemployed.

A related study to examine problems of preparing youth for effective occupational utilization has been proposed by Pennsylvania State University, Graduate School of Education, Rutgers University, and State University of New Jersey as a joint investigation under a grant from U.S.O.E. (Kaugman, 1965) The research will be an intensive two-year study conducted in nine communitites of varying sizes in Middle Atlantic States, where vocational education programs in public schools will be assessed to learn the extent that youth are being equipped to enter the labor force, the ways in which programs might be strengthened to reduce school dropouts and minimize unemployment. The study will include a survey of vocational school graduates and graduates of college preparatory programs who entered employment instead of college.

Background of the Study

Although the fundamental problem underlying this study is of national scope and the successful development of a systematic cyclical approach to vocational education planning-implementation-evaluation will have far reaching implications for the national scene, the antecedents of the study grew out of an initial attempt to cope with a felt need at the state level.

Before the turn of this decade a critical need was recognized in Oregon for a more comprehensive approach to determining the effectiveness of existing vocational education programs and projecting program needs for the future. Studies of need, including provisions for machine tabulation of findings, were conducted on an experimental basis. (Lane County, 1957) Enrollment projections were made for post-high school vocational education programs based upon student needs. (Oregon State Department of Education, 1961b) Extensive planning of vocational education was prompted during the last five-year period through the growth of community colleges. (Oregon State Department of Education, 1961a) This planning for the future development of vocational education has only accentuated the need for a more comprehensive and systematic approach to the problem.

In an effort to meet this challenge, and to implement one of the recommendations of the Panel of Consultants (Clark, 1963) an Oregon State Coordinating Committee on Systematic Planning for Vocational Education was appointed in the fall of 1964 by the State Director of Vocational Education. This Committee was made up of program supervisors and other consultants from the Division of Community Colleges and Vocational Education and the Division of Educational Development of the State Department of Education and local administrators of vocational education programs in the local public schools and community colleges. Special consultants from the State Department of Employment and Oregon State University aided the Committee in its deliberations.

With the counsel of the State Coordinating Committee a rationale for the structuring of the systematic approach to statewide planning and evaluation of vocational education was conceived. Concurrent with this planning were the provisions for the development and continuation of regional seminars for vocational education program planning and upgrading at the community level.

The regional seminars consisted basically of inservice training of key persons in educational institutions and agencies of the state. Emerging from the seminars was recognition on the part of participants of the need for more adequate data pertinent to the development of an optimum program of vocational education throughout the state.

Although the seminar approach did produce favorable outcomes, major limitations to the plan were observed:

(1) data describing manpower and/or employment situations in some regions were inadequate; (2) attempts to maintain continuity were not completely successful; (3) programs had not been developed to prepare workers with skills needed for emerging job clusters.

One of the conclusions reached by the Committee as an outgrowth of the seminar approach was that upgrading of vocational education programs could not reach desired levels without adequate and appropriate input information. It was agreed that decision-makers at Committee level, as well as local and regional centers, needed information about actual and anticipated human resources and occupations. The preliminary efforts of the Committee pointed up the need for an integrated plan of identifying actual and anticipated job clusters and defining characteristics of current and potential human resources. The Committee suggested the need for continuous evaluation of vocational programs, and development of new programs on local, regional, and state levels based on input information plus evaluations of programs.

It was in an attempt to satisfy demands for program planning-implementation-evaluation that this study was undertaken. The aims of the study represent combined efforts of members of the Coordinating Committee and reflect thinking of field representatives on local and regional levels. The study carries endorsements from institutions of higher learning in Oregon and the State Board of Education.

Objectives

This report details the first of four phases of a comprehensive study whose broad objectives are to develop and test the effectiveness of a feedback system of vocational education planning, implementation, and evaluation to create and modify training programs on a continuing basis. The four major phases are to include: (1) development and evaluation of data-gather instruments and a job clustering system, and preparation of manuals for use; (2) pilot program to test feedback system of vocational education planning-implementation-evaluation in a selected region, followed by modifications in overall design; (3) statewide testing of feedback system of vocational education planning-implementation-evaluation, using databank on regional levels;

(4) demonstration projects throughout the state and dissemination of findings to national scene.

A central aim of the study is to deal with problems of gaining optimum employment by developing articulated programs of vocational education at the non-baccalaureate degree level; to cope with issues of economy-based unemployment reflected in the discrepancy between vocational education training programs and skill requirements of emerging job clusters; and to establish and maintain balance between available human resources and occupational opportunities in light of economic, social and technological changes.

The portion of the study reported herein deals only with the first phase. The specific objectives of this first phase were

A. to develop and evaluate data gathering instruments for continuous assessment of human resources, employment opportunities, and educational and training programs.

B. To develop a system for assessing job opportunities that cluster the common skill and knowledge factors required in the job.

C. to develop manuals of procedures for field personnel to administer the data gathering instruments and to employ the clustering system.

Resumé of Development

There have been two major thrusts in fulfilling the objectives of Phase I of the study. The first effort involved a sub contract with the Bureau of Educational Research, University of Oregon, the final report of which is included with this report as supporting documents A and B.

Because the State Department of Education considered that the University of Oregon report did not fully satisfy the terms of the original proposal, a subsequent sub contract was made with the Teaching Research Division. In order to accomplish the specific objectives of Phase I stated earlier, the research conducted by the Teaching Research Division consisted of two major parts. One dealt with the development of instruments to assess the human resources, employment opportunities, and vocational education programs in Oregon; the second part was concerned with the development of a clustering system by which jobs possessing common characteristics could be grouped together. This main document reports the research findings of the Teaching Research Division.

The remaining chapters of this report have been arranged to present the reader with an exposition of the two parts of Phase I of the research. Presented in Chapter II are the methods employed in developing measuring instruments. Chapter III contains the results and discusses the development of the measuring instruments. In Chapter IV, the method of developing the clustering system is presented. Results and discussion of the clustering system make up Chapter V. Summary, conclusions and implications of both the instrument development and the clustering system are contained in Chapter VI.

Chapter II

Method of Developing Data Gathering Instruments

As a preliminary step to the development of data gathering instruments, the information required for each of the broad areas of human resources, employment opportunities and vocational education programs was determined. Primary sources from which specific information would be derived were identified and common information was pooled according to these sources. Potential secondary sources for obtaining the information were determined and verified through personal contact with representatives of the institutions and agencies involved.

Questionnaire items were formulated from the information item pools with respect to the anticipated sources to be utilized. Seven preliminary survey instruments were developed and tested with samples of each appropriate population group. Each instrument was modified until reliability, validity, and ease of use were judged satisfactory.

Obtaining Required Information

The first step in the determination of information required for developing measurement instruments consisted of a detailed analysis of the broad questions related to vocational education program planning, compiled by the Oregon State Coordinating Committee on Systematic Planning for Vocational Education. (See Appendix A for listing of questions.) Purpose of the analysis was to identify and classify elements of the questions related to the areas of human resources, employment opportunities, and vocational education programs; and to determine the relationships of the elements to these three areas. Output from this analysis produced a listing of general information needs which was categorized under the headings of (a) status information describing the current situation, and (b) projected information describing anticipated situations.

The next step involved a deliniation of specific information needs from the general needs statements as a basis for developing instruments. The approach used was one of logical interpretation and extrapolation and had two stages: first, the generation of specific information items without regard for appropriateness to the measurement requirements; second, the screening out of undesirable items on the basis of the following criteria: information items had to be (a) financially feasible to obtain (e.g., to assess housewives' occupational aspirations would require a door-to-door canvass, regarded beyond the financial limitations of the study); (b) amenable to automated data processing; (c) nonoffensive in terms of individual rights.

Information items meeting the above criteria were further screened on the basis of ability to permit data collection on a statewide basis as well as from any political or geographical subdivision. The purpose of this screening was to remove items appropriate only to certain local areas and thereby increase validity of information with respect to state and national application.

Primary Data Sources

The primary data sources from which data could be gathered to satisfy the aims of the study were determined by an analysis of the broad questions listed in Appendix A. The primary sources identified were categorized according to three areas: human resources, employment opportunities and vocational education programs.

The following criteria were established to determine which primary sources were to be included. Under human resources, primary sources were to include population age groups 14 years and older; and were not to include self-employed workers, domestic services, and agricultural workers. Primary sources in job opportunities were to include occupations of skilled and semi-skilled jobs (but not jobs near or at the common labor level nor those requiring a four-year baccalaureate or higher degree). Vocational education program primary sources were to include all public supported education and training programs (limited to the human resource age criterion); all employer operated training programs of four weeks duration or more and related to skilled and semi-skilled jobs; and all state licensed private operated training programs related to skilled and semi-skilled jobs.

Secondary Data Sources

Quantities of data related to the aims of the study are collected and stored each year by various educational and education-related institutions and agencies in Oregon. These institutions and agencies are regarded as secondary in the sense that they collect and store data which are primary to other sources. It was assumed that considerable time and expense to the state might be saved if existing institutional and agency data could be used for the purposes of the study. The following guidelines were established to assist in determining the acceptability of various secondary sources: (1) data must be physically located such that it is reasonably accessible. While this was rather subjective, it pertained to the actual job of "digging out" the data and whether it was reasonable to accomplish in terms of the relative importance of the data, its availability from other sources, and the expected time, manpower and costs required for the task; (2) data must be recorded in a form compatible with the data to be generated from primary sources; and (3) data must be stored in a form to provide ease of retrieval--preferably ADP.

Institutions and agencies viewed as potential secondary sources were identified and classified according to the appropriateness of the data to human resources, employment opportunities, and/or vocational education programs. The search for potential secondary sources was initiated with the Oregon State Department of Education, Division of Vocational Education and the Oregon Department of Employment. Then other potential sources were identified from these first sources and so forth until all potential secondary sources in Oregon were exhausted within the time limits imposed by the study. (This effort proved to be very complex and required much more time than that which had been planned.)

Instrument Development

The total pool of information items discussed above, was sorted into pools of items appropriate to each primary source identified for inclusion in the study. Items common to two or more primary sources were identified to permit coordinated handling in instrument development. Information items which appeared obtainable from secondary sources were identified.

Decisions for sorting information items were based on the best estimates that could be made with respect to the following criteria: information should be obtained from (1) a primary source when it is not available from a secondary source; (2) a primary rather than a secondary source if a preference exists; (3) a secondary source whenever financial efficiency can be maintained and storage format is compatible with other primary generated data. Field testing, to be discussed below, served as a limited test of best sources for obtaining required data.

The instruments developed by the Bureau of Educational Research, University of Oregon (see supporting Document A, pp. 33-75), were analyzed to determine to what extent they covered the needed information, what items had appropriate format and language level, and what revisions were necessary to make poor items useable. In a manner similar to that of treating information items, the useable items from these instruments were sorted into primary source pools.

Questions were structured for each primary source designed to elicit the information asked for in the item pools. Particular attention was given to format and verbal comprehension level of each primary source to be surveyed. Responses to questions were designed so as to permit use of automated data processing. In the few instances where written responses were called for, coding systems were determined to assure appropriate utilization of numerical processing.

Field Testing

Instruments were field tested with subjects drawn from the various populations appropriate to the study. Tryouts were handled in what is termed a cyclical process. That is, initial tryouts were conducted on an individual, one-to-one, basis with the examiner observing very closely all aspects of the subjects' behavior. Following revision of the instruments subsequent tryouts required less and less close suprevision on the part of the examiner and relied more upon feedback resulting from analysis of respondents' scoring patterns.

Initial testing called for the respondent to supply the examiner the following information: (1) what he interpreted each statement to mean, (2) if a statement was confusing in any way, (3) specific words difficult to understand, (4) willingness to supply the information and opinion of the willingness of peers to supply this type of information, and (5) any specific recommendations for changes in content, language, or format.

Subsequent field testing requested respondents to identify by question mark or marginal note those parts that were confusing or inappropriate to answer. During testing, the time required to complete the questionnaire was recorded and subjects were observed for apparent physical fatigue in completing the instruments.

Efforts were made to select respondents who were representative of the specific populations to be surveyed and who would provide frank and objective criticism of the instrument. This later was accomplished, in the case of students and dropouts, by requesting school officials to suggest those individuals whom they felt would be apt to cooperate in providing the desired information; and in the case of employers and employees, by simply asking whether or not they would be willing to take the time required for the task. (It might be mentioned that lack of cooperation in field test activities was the exception.) Tryouts of instruments were conducted with as many sub-groups of populations as could be reasonably handled. For example, selecting secondary school student seniors representing both sexes from small, medium and large high schools and of varied academic ability levels; selecting employees and employers from small, medium, and large firms; and selecting proprietary directors representing different areas of emphasis.

When field testing was completed a manual was developed designed to provide field personnel maximum information for administering the data gathering instruments.

Chapter III

Results and Discussion

Data Gathering Instruments

Outcomes of the development of the data gathering instruments are presented and discussed in an order that follows closely the organization of Chapter II. Additional materials detailing various aspects of the development that were not considered critical to the understanding of the important ideas in the development were removed from this section and included as appendixes.

Required Information

As a result of analyzing the broad general questions compiled by the Oregon Coordinating Committee (see appendix A.), a listing of general information needs for the study was produced. Table 1. contains the listing categorized under two headings: (A) Status information describing current situations, and (B) Projected information describing anticipated situations.

Table I

General Information Needs

A. Status Information Describing Current Situations

1. Descriptive data (geographic boundaries of the labor market, geographic boundaries of training areas)
2. Job data (number of jobs requiring trained workers; kind of jobs requiring trained worker; number of jobs in major occupational groups; number of employees in selected jobs; entrance requirements for job clusters; hiring practices of private and government agencies, school placement offices; entrant numbers by occupation, firm, occupational group; sources qualified entrants)
3. Human resources data (extent of employment; extent of unemployment; distribution of the work force by occupational group and occupation; labor force population characteristics - age, sex, occupation, education, income, residence, length of state residence)

Table I (continued)

4. Vocational education development (facilities available-location, kind, purpose, use; programs available - location,, kind, purpose, use; sources of training - public and private institutions, industries, trades, employee organizations)

B. Projected information, describing anticipated situations

1. Description data (anticipated boundaries of labor market; anticipated boundaries of economic areas; anticipated boundaries of training areas)

2. Job data (jobs expected to have openings; anticipated emerging job clusters; skill requirements of emerging job clusters; employment demands for job clusters; duration of demand for these jobs; entrance requirements for anticipated jobs; anticipated hiring practices; predicted occupational trends; predicted business trends; predicted resource development; predicted transportation patterns; predicted sociological changes; predicted psychological changes in workers)

3. Human resource data (expected abilities of high school youth and dropouts; occupational aspirations of these youth; expected aptitudes of employed workers and unemployed trainable adults; expected interests of these adults; anticipated educational background of adults; expected residence preferences of youth and adults; expected willingness to train or re-train for selected jobs)

4. Vocational education development (planned facilities - kind, location, financial support, potential enrollment, staff; planned programs - kind, location, purpose)

The next stage of development called for the delineation of specific information from the general information needs statements presented in Table 1. Results of this delineation produced a detailed listing of information needs, the main headings of which are listed in Table 2. The complete listing of all information needs for the study is presented in Appendix B.

Table 2

Specific Information Needs

A. Human Resources (Current and Projected)

1. Population characteristics
2. Employment history
3. Job satisfaction or dissatisfaction
4. Aspiration level
5. Abilities and aptitudes

B. Employment Opportunities (Current and Projected)

1. Jobs and occupations
2. Labor force
3. Hiring practices
4. Anticipated job changes
5. Anticipated new jobs
6. Anticipated labor force

C. Vocational Education Programs (non-baccalaureate level)

1. Existing programs
2. Existing facilities
3. Teaching staff
4. Anticipated program changes
5. Anticipated facilities changes

Primary Sources

Seven primary sources were selected from which data would be gathered to satisfy the information needs of the study. The seven primary sources and the areas represented in each, are listed in Table 3.

Table 3

Primary Sources and Represented Areas

---

1. Students

   Public and private schools
   Community college
   Apprenticeship training
   Vocational or proprietary

Table 3 (Continued)

2. Dropouts

   Public and private schools

3. Employee

   Employed
   Unemployed
   MDTA programs

4. Employers

   Large firms
   Medium Firms
   Small firms

5. Secondary School Vocational Education Programs

   Public & private schools

6. Community College

   Day and night programs
   Adult program

7. Proprietary Schools

   Day and night programs

All 12th grade students of public and private high schools were selected over other high school students because of their greater maturity. In addition, most students at this grade level have made specific plans for work or continued education after graduation. Thus, it was assumed that the responses of this age group about projected post-high school plans would be more realistic and reliable than the plans of students in earlier high school grades. As the total feedback model for gathering human resource data is refined, students from lower grade levels should then be surveyed.

All students attending community college were selected for the study. This includes students in day and/or night school vocational-technical programs, adult education students and those enrolled in college transfer programs. These students may be enrolled in vocational as well as "transfer" courses, attending both day and night school classes, or taking "transfer" subjects during day sessions and vocational subjects at night.

As such, a systematic procedure for administering the questionnaire will be necessary if duplicate student responses are to be avoided.

Approximately 2300 persons are currently enrolled in apprenticeship training in Oregon. Though each apprentice is employed at his trade, he also attends classes in day or night school sessions. The community colleges and local school districts of Oregon service approximately 90% of all students engaged in apprenticeship programs. Thus, it was considered easier to identify and survey the apprentice as a student rather than as an employee. Further, it was assumed that most apprentices are in the younger age groups with limited work experience and that their potential contribution to the labor force as seen through their training efforts, aspirations and goals would be more significant to the study.

Proprietary schools are service oriented schools which are privately owned and managed. A substantial number of youth and adults receive post-high school vocational education through proprietary schools. In most fields of vocational education, these schools have more specialized course offerings than do public institutions. Their endeavors to remain flexible have permitted them to adapt rapidly to the current and changing needs of business and industry in training persons for specific jobs. Thus, they were considered as a necessary population in the study.

Most of the vocational rehabilitation programs are designed to meet the special needs of handicapped persons. The length of time required to complete training is dependent upon each individual. Since these programs are oriented to individual interests, are highly informal, and accommodate a relatively minimal segment of the total human resources of the state, rehabilitation trainees were excluded from the study.

For the purpose of this study, a high school dropout has been defined as a student who has been enrolled in high school but has left before graduation for reasons other than illness and has failed to re-enter that or any other high school. Dropouts to be included are those students between the ages of 14 and 18 who left school during the 22 months immediately prior to the date of initiating the survey and who are residing in the survey area.

All employed and unemployed workers in the skilled and semiskilled occupations are to be included as a population universe for the study. In view of the fact that a large part of the preparation for the Manpower Development and Training Act (MDTA) programs is accomplished on-the-job, it was judged more appropriate to survey this population as employees rather than as students.

Employers of firms representing skilled and semi-skilled occupations are to be surveyed. Firms were distinguished in size as follows: small firms = less than 10 employees, medium firms = 10 to 50 employees, large = over 50 employees. This identification is consistent with that developed by the Oregon Department of Employment.

Secondary Sources

The availability of secondary sources for inclusion in the study to reduce the need to gather so much data from primary sources proved to be generally disappointing. Although it was found that considerable human resource data is gathered by various state agencies in Oregon, the data was either (1) not recorded in a form such that it could be matched-up with its referent, as was most of the data contained by the State Department of Education; (2) regarded as confidential and could not be obtained, as was the case with the Internal Revenue Service and the Department of Social Security; or (3) recorded in a form which was incompatible with the needs of the study. Table 4 lists secondary sources contacted in Oregon as potential data sources for the study.

Table 4

Potential Secondary Data Sources

1. Oregon State Department of Education, Division of Community Colleges and Vocational Education
2. Oregon State Department of Education, Division of Standards
3. Oregon State Department of Education, Division of Instruction
4. Oregon State Department of Education, Division of Research
5. Oregon State Department of Education, Division of Vocational Rehabilitation
6. Oregon Association of Proprietary Schools

Table 4 (Continued)

7. Governor's Committee on Post High School Education in Oregon
8. Lane County Youth Study Project
9. High School-College Relations Council
10. Oregon Total Information System (OTIS)
11. Oregon State Department of Labor
12. Oregon State Bureau of Apprenticeship
13. Oregon State Board of Barber and Cosmetology Examiner
14. Center for Population Research and Census
15. The Division of Continuing Education
16. Salem Office of AFL-CIO
17. Oregon Department of Employment
18. Regional Office of U.S. Department of Agriculture
19. Marion County Agent
20. Marion County Assessor
21. Internal Revenue Service
22. Department of Social Security
23. Oregon Associate Industries

Of the secondary sources listed in Table 4, only data from the Oregon State Department of Education, specifically the Division of Community College and Vocational Education; and the Division of Research and Statistics of the State Department of Employment met the criteria for acceptance in the study.

Data to be gathered from the Division of Community Colleges considered usable to the study is contained in Appendix C. A sample of the Data Collection forms available from the State Department of Employment along with the Data Processing Code Sheet is shown in Appendix F (see p. 209).

Instrument Development

One step in the instrument development process involved the analysis of the instruments developed by the Bureau of Educational Research, University of Oregon to determine sections considered usable in the study. In general, the State Department of Education judged the instruments to be inadequate to satisfy the purpose of the study; however, many items were found to be useful and were incorporated into the present instrument. The results of the analysis are contained in Appendix D.

Seven instruments were developed as the fundamental means for gathering data on human resources, job opportunities, and vocational education programs. The seven instruments are briefly described below and presented in their entirety in Appendix E (see pp. 128-188).

1. Student Questionnaire. This instrument was designed for use with secondary and post high school (non-baccalaureate) students and yields information such as educational preparation, occupational history, occupational intentions, and certain demographic data.

2. Dropout Questionnaire. This instrument was designed for use with students who had dropped out of secondary schools and yields information such as educational experience, employment and/or unemployment history, aspirations, and certain demographic data.

3. Employee Questionnaire. This instrument was designed for use with employees and yields information such as employment-unemployment history, occupation, extended education and training, and certain demographic data.

4. Employer Questionnaire. This instrument was designed for use with occupational establishments and yields information such as hiring practices, number and type of jobs, number and distribution of workers to jobs, and education and training requirements of workers.

5. Secondary School Questionnaire. This instrument was designed for use with secondary school vocational programs and yields information as to the number of teachers, student enrollments, vocational educational enrollment, adequacy of facilities, and anticipated changes to vocational education program.

6. Community College Questionnaire. This instrument was designed for use with community college vocational programs and yields information such as current and anticipated admissions requirements, student costs and sources of funds for vocational education, size of program, and adequacy of facilities.

7. Proprietary Schools Questionnaire. This instrument was designed for use with proprietary school programs and yields information such as current and anticipated admissions requirements, student costs and sources of funds for vocational education, size of program, and graduation history by occupation.

Field Testing

Using appropriate samples of individuals and small groups, each instrument was field tested, analyzed, and modified in a cyclical manner until judged adequate in terms of reliability, validity, and usability.

Reliability was defined as the accuracy and consistency of an instrument to measure that for which it was intended. Reliability was not used in this study as it is normally interpreted in test construction. In test construction, for example, reliability concerns the consistency with which an individual will score a particular test upon its repeated administration, all other things being equal. As used in the development of the instruments in this study, reliability had a slightly different meaning. It referred to the accuracy of item meaning to individuals and whether or not this meaning was consistent among individuals. Validity was defined by the question, does the instrument measure what it was designed to measure? Usability was defined as the degree to which an instrument can be put into action to serve the purpose for which it was intended.

The more powerful statistical methods for determining whether the instruments developed in this study adequately met these three characteristics were not appropriate; therefore, other more subjective but sufficiently valid methods were used.

Results of field testing with specific tryout populations produced instruments that contained (1) words that were apparently understandable, (2) statements that were apparently clear in meaning, (3) statements that were apparently singular in meaning, and (4) instructions for completing the instrument that were apparently clear and understandable. The above results apply to all instruments developed and were judged sufficient to satisfy the requirements of reliability.

Validity of the instruments was judged adequate on the basis of content validity. Each item in each instrument was systematically checked for relevance against the questions listed by the State Coordinating Committee (see Appendix A). Furthermore, items were subjected to content evaluation by appropriate level "experts" in various areas: i.e., consultants in the Vocational Education Department, Director of Licensing for Proprietary Schools, Executive Committee of Proprietary School Association, several leading administrators of high schools and community colleges, Director of Research of Department of Employment, supervisor of field studies for unemployment, heads of several firms, and several school guidance counselors.

Instrument usability was judged adequate for each instrument on the basis of subjects' feedback from tryouts. Factors contributing were the following: (1) time limits for scoring: modifications were made to instruments until respondents regarded scoring time acceptable; (2) instructions: special instructions for scoring the instruments and for answering certain specific items were revised until consistent desirable response patterns were obtained from respondents; (3) willingness to answer: any items that respondents resisted answering were either removed or modified until acceptable.

Although each instrument was tried out and modified until deemed sufficiently usable to meet the requirements of the study, it should be made clear that this judgment must be limited to the field test populations. Additional tests of usability must be made with the instruments when being administered in subsequent pilot efforts to intact systems; i.e., several total school districts, or various business and industrial firms and their employees.

The population samples employed for field testing each instrument are described in Table 5.

Table 5

Size and Composition of Samples for Field Testing Instruments

---

Student Questionnaire - Twelve senior students were selected from small, medium, and large high schools representing varied academic abilities; 6 first year students were selected from a medium sized community college; and 4 students were selected from a large proprietary school.

Table 5 (Continued)

Employer Questionnaire. Twenty-one employees were selected from small, medium, and large sized firms representative of credit and loan, department stores, architectural engineering, metal products manufacturing, automotive servicing, printing, and electrical contracting.

Secondary School Questionnaire. Four principals were selected from small, medium, and large secondary schools.

Community College Questionnaire. Two presidents and one Dean of Instruction were selected from three medium sized community colleges.

Proprietary School Questionnaire. 6 Directors were selected from proprietary schools of small, medium and large sizes representing vocational schools of business, electronics, trade, and technical, dental and medical technicians.

Manual

A manual of procedures was developed to guide field personnel in administering the instruments. General details were developed for preliminary procedures regarding advanced notification to respondents of the nature and purpose of the study, preparation of materials, distribution routines, orientation and planning for administration of instruments, and return of completed instruments.

Specific details were developed to guide administration of each of the instruments. Where alternative procedures appeared appropriate, they were spelled out. Attention was given to preplanning timing, optimizing scheduling of respondents, providing proctors, follow-up of absentees, and completion routines. The complete guide to administering the instruments is contained in Appendix E.

Supplementary information to utilizing the instruments in subsequent phases of the study was also developed. This information condensed vital details of interrelated data sources in the state and was considered too important to be omitted from the report. The supplement to utilizing the instruments is reproduced in full in Appendix F.

Chapter IV
System for Clustering Jobs

Introduction

Objectives

This phase of the state-wide study of systematic vocational educational planning, implementation, and evaluation (PIE) was concerned with the establishment of a procedural system for processing data of job characteristics and worker requirements in such a manner that clusters of common jobs could be realized. The specific objective for this phase was as follows:

> To develop a system whereby various jobs that require certain common worker functions and mental processes can be clustered.

In the ultimate application of the system developed in this research it is hoped that it will allow systematic determination and description of current and anticipated job clusters encompassing the total world of work so as to permit the planning and development of vocational education programs that ensure the necessary training of students to meet the requirements of the new jobs.

The general procedures in fulfilling the above objective involved the following steps: (1) Establish a conceptual framework for the clustering system; (2) select a set of occupations appropriate to the study; (3) from the set of occupations, select a sample of representative jobs; (4) collect task information from the sample of jobs; (5) analyze the task descriptions in terms of job content, i.e., worker function and mental process; (6) develop a method for clustering common jobs.

Conceptual Framework

The central concept of the clustering system used in this research is that the tasks performed by a worker in a given job involve both a physical and mental function i.e., what a worker does to things, data, and people (to be referred to as functions) and what mental processes the worker engages in while working (to be referred to as processes). Accordingly, the primary emphasis in the study has been placed on the elaboration of the requirements of the work in terms of these functions and processes dimensions. This research has proceeded on the belief that different job clusters will exhibit characteristic patterns of what workers do with things, data, and people and what mental processes are engaged in in each.

Vital to the approach of this clustering system is the analysis of descriptions of task actions in terms of the functions of what workers do to things, data, and people, and the mental processes they engage in in the work situation. In this research the job is seen as composed of several basic tasks; each basic task in turn made up of a series of task actions. The term task action is used to mean one of a group of activities performed by a worker generally occurring in close sequence with other activities and having a common purpose towards a specific output; it forms an important and necessary part of several activities which comprise a basic task.

Before an analysis of the function and processes dimensions of basic task could begin, a basis for the analysis had to be provided. Thus, in characterizing the requirements of specific basic task of jobs, it was first necessary to designate the sub-stance and form of the work. In this research, the substance and form of basic tasks emerged from a series of statements describing what the worker does, what he does it to (if appropriate), and what he does it with (if appropriate).

The classification of occupations and jobs has received considerable attention in recent years, particularly that supported by the Bureau of Employment Security and the U.S. Department of Labor. The problem of grouping like jobs together has been approached in many ways. For instance, the Dictionary of Occupational Titles emphasizes categories that group jobs on the basis of characteristics identifying traits and abilities required of the worker; and on the basis of a combination of work field, purpose, materials, product, subject matter, and/or industry (1965). For demographic purposes, the Bureau of the Census classifies occupation into eleven major groups by title only without definition (Shartle 1959).

These approaches to grouping jobs and occupations conceptualize the job as the basic unit for analysis rather than the tasks actually performed on the job. In classifying occupations at the job level the underlying assumption is that the task patterns related to certain job titles are fundamentally the same and constant, thus permitting the job to be the basic unit of analysis.

The above assumption was not appropriate to the needs of this project. In order to achieve a level of classification permitting translation to vocational-technical instructional programing it was necessary to approach the problem at the level of task analysis.

Although a number of techniques are available for classifying and grouping tasks, the restrictions imposed by the purposes of this research limited the technique to be used. For example, classification of task has been attempted as stimulus-response events (Cotterman, 1959), as man-machine elements (Stolurow, 1960) and in terms of their pattern of technical performance (Silverman, 1966). In this research, tasks were classified according to functional performance behaviors and mental processes patterns. These classifications were then coded and clustered according to their similarity. This classification scheme imposed particular constraints upon the analytical procedures that could be used.

A second constraint was centered on the requirement of eventually clustering jobs at a state-wide level by means of a system which was operationally simple and adaptable to computer processing. Although the scope of this research did not permit computer involvement, the methodology has been adapted from a technique developed by Silverman (1966) for clustering tasks using an interative computer clustering technique and therefore can be computerized very easily.

Selecting Occupational Areas

In order to reduce the many occupational areas into some manageable form from which a sample of occupations could be drawn for this study, the following broard areas were established.

1. Mechanical - jobs dealing with machines and mechanical principles.
2. Electrical - jobs dealing with concepts and principles of electricity, electro-mechanics, and electronics.
3. Spatial - Structural - jobs requiring application of geometric, numerical, and drawing techniques to problems of structural design and representation.
4. Chemical - Biological - jobs requiring the application of elementary concepts and principles of chemistry, biology, and physics to common problems in the work.
5. Symbolic - jobs dealing primarily with verbal and numerical components.
6. People - jobs dealing primarily with verbal aspects of human interaction and relations.

This organization permits a rough sort of continuum of occupational types from the mechanical or hardware end to the people or human end. Recent research by Altman (1966), in studying the domain of general vocational capabilities, gives strength to this organization. Results of his factor analytic work with occupations representing major employment opportunities over the next ten years suggested an underlying continuum of hardware-to-people (Altman, 1966, p. xi).

The important considerations in selecting a sample of occupations for study were established in discussions with the Oregon Department of Vocational Education. The objective was two fold: to select occupations appropriate for Phase II of the PIE study and from which a smaller sample of occupations could be selected for this clustering study. On this basis the following criteria for occupation selection were established:

1. social acceptablility in terms of training in vocational education programs; (Thus, occupations such as bartender were not considered acceptable)

2. a reasonably large work force currently employed in Oregon (approximately 1000);

3. substantial future increases in employment prospects appear good; i.e., approximately 500 or more workers in the next five years;

4. neither low--near common labor level of work--nor requiring a bachelor's or higher academic degree; and

5. reasonable representation across industries.

In making selections of occupations, primary emphasis was placed on the information contained in supporting documents, Exhibit A and Exhibit B in which 143 key occupations in Oregon were identified. Additional information was obtained from Technological Changes and Its Impact on the Oregon Labor Force, 1966, the Dictionary of Occupational Titles, 1965, and Occupational Outlook Handbook, 1966-67.

Sample of Representative Jobs

When occupations had been identified meeting the above criteria, a sample of representative jobs for each occupation was then selected. Jobs were selected to meet the following criteria:

1. must involve a wide variety of tasks as contrasted with a limited variety;

all of the sub elements constituting any one basic task. Thus several task descriptions for the basic task engine major tune-up might include (1) analyze problem and determine work required, (2) recall plan of action for major tune-up, (3) remove spark plugs with proper wrench and check cylinder compression. (4) remove fuel pump with wrenches and check pumping pressure against factory specifications.

In the present study, the respondent was requested to select one basic task in his job and to describe each action required in the task. The interviewer prompted the respondent with three questions:

1. What does the worker do?

2. What does he do to it? (if appropriate)

3. What does he do with it? (if appropriate)

Goals for task descriptions were:

1. Fidelity in generation and translation of task information.

2. Sufficient detail to include all important worker functions and processes.

3. Descriptions of the work requirements in a form translatable into the two dimensional classification scheme developed for classifying task actions.

The following information was recorded for task action of each basic task.

1. Objects acted upon. These are the persons, objects and/or things which are in some way affected by the workers actions in the task.

2. Information that guides the action. These are the cues in the work situation that prompts or signals the worker to perform the action; they may take the form of recall, information given by others, procedural guides in a manual, logical solutions to problems, etc.

3. Tools and equipment. These are aids, other than body members, used in accomplishing the actions of the task.

4. Actions. These are actual performances required of the worker to achieve the purpose of the task. Action verbs were important to denote the effect of the action upon an object.

5. Indication of completed actions. These are feedback signals received by the worker to indicate completion of any specific task action or the total task. They were usually described in terms of the state of the object after completion of the action or in terms of specific signals serving as designators of completion. Frequently, they were the cue for the worker to begin the next action.

Work sheets were developed for the purpose of recording task descriptions. An example of a worksheet is shown in figure 1.

Employee and/or Firm	Task Description	Date Interviewer

Job Title________________________________
Task Name________________________________
Object Acted Upon________________________
Information Guiding Action_______________
Tools____________________________________
Actions__________________________________

Worker

Function · Process   Description of Task Actions

1.

2.

3.

Figure 1. Worksheet for Recording Task Descriptions

Analysis and Classification of Task Descriptions

A basic point of view underlying the present research was that every job requires a worker to function with things, data, and people in various ways and that while so functioning the worker is simultaneously engaging in certain mental processes. In order to express what a worker does, functional terms (verbs) were used specific to each of the categories things, data, and people*. These functional terms were arranged in hierarchies with about eight functions in each category. The first numbered function in each hierarchy is considered the simplest and the last numbered function the most complex.

The category of things is defined as inanimate objects, materials, machines, tools, equipment, and products -- a thing is tangible and has shape and form. Functional terms for things include handling, feeding- offbearing, tending, manipulating, driving - operating, operating - controlling, precision working, and setting-up. Table 6 presents the terms and definitions for things.

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* The categories and definitions have been adapted from The Dictionary of Occupational Titles, 1965 Vol. II, pp. 649-650.

Table 6

Functional Terms for Things

Functional Terms	Definitions
1. Handling	Using body, handtools and/or special devices to work, move or carry objects or materials. Little judgment required
2. Feeding-Offbearing	Inserting, throwing, dumping or placing materials in, or removing them from machines or equipment
3. Tending	Starting, stopping and observing functioning of machines and equipment. Low level judgments required in making adjustments
4. Manipulating	Using body, tools or special devices to work, move, guide or place objects or materials. Requires some judgment
5. Driving-operating	Starting, stopping and controlling machines or equipment in which a course must be steered to fabricate, process and/or move things or people. Includes estimating distance, determining speed and direction of other objects
6. Operating-Controlling	Starting and stopping, controlling and adjusting machines or equipment designed to fabricate test, monitor, and/or process materials or objects. Controlling involves temperatures, pressure, flow of liquids and electrons, speed of pump, and reaction on materials
7. Precision working	Using body members and/or tools to work, move, guide or place objects or materials in situations requiring considerable judgment and low tolerance limits

8. Setting Up - Adjusting machines or equipment - replacing altering and/or aligning jigs, fixtures and attachments, to prepare, change or restore functions

Data defined as information, knowledge, and conception related to data, things, or people, either written or in idea form. Terms used to express worker functions with data include comparing, copying, computing, compiling, analyzing, coordinating, and synthesizing. The functional terms for data are presented and defined in Table 7.

Table 7
Functional Terms of Data

1.

Functional Terms	Definitions
1. Comparing	Judging degree of congruence of data, people or things
2. Copying	Transcribing, entering or posting data, duplicating with a like kind.
3. Computing	Performing calculating operations - with data supplied.
4. Compiling	Gathering, collating, classifying information about data, people or things.
5. Analyzing	Examining and evaluating data - often results in alternative action choices - often includes compiling, computing and comparing.
6. Coordinating	Determining time, place and sequence of operations or actions re analysis.
7. Synthesizing	Integrating analysis of data to discover facts and/or develop knowledge or interpretations.

The third category of people is defined simply as human beings. Functional terms for people include taking instructions, serving, speaking-signaling, persuading, diverting, supervising, instructing, and negotiating. Functional terms and definitions for people are shown in Table 8.

Table 8
Functional Terms for People

Functional Terms	Definitions
1. Taking instructions	helping
2. Serving	Attending the needs of people - immediate response involved
3. Speaking-signaling	talking or signaling to exchange information
4. Persuading	Influencing others in a product, service or point of view
5. Diverting	Amusing others
6. Supervising	Interpreting work procedures, assigning duties and promoting efficiency among workers
7. Instructing	Teaching or training others
8. Negotiating	Exchanging ideas, information and opinions to determine policy and programs and/or decisions

Mental processes are considered to be the modes by which the worker translates input information into functional responses. The categories used to express processes, from simple to complex, include chaining or rote sequencing, discriminating or identifying, coding, classifying, discrete estimating, continuous estimating, logical manipulation, rule using, decision making, and problem solving. Table 9 presents the categories and definitions of mental processes.

Table 9
Mental Processes Categories

Mental Processes — Definitions

1. Chaining or rote sequencing - following a pre-specified order of verbal and/or motor acts in carrying out an action or procedure.

2. Discriminating or identifying - perceiving the appearance of a target as distinct from other targets.

3. Coding - translating a perceived stimulus into another form, locus or language; not necessarily involving the application of a sequence of logical rules.

4. Classifying - perceiving an object or target as representative of a particular class, where the objective characteristics of targets within the class may be widely dissimilar.

5. Discrete Estimating - perceiving discontinuities in changes of distance, size and/or rate, with discrete recording or responding.

6. Continuous Estimating - perceiving changes in continuous fluctuations of distance, size and/or rate with continuous responding.

7. Logical manipulation - application of formal rules of logic, rules established through job routines, and/or computation to an input as a basis for determining the appropriate output.

8. Rule using - executing a course of action, including one or more contingencies, by the application of a rule or principle.

9. Decision making - choosing one out of a field of alternative actions.

10. Problem solving - resolving courses of action where routine application of rules for logical manipulation and decision making would be inadequate for optimum choice. This would seem to imply the integration and adaptation of existing principles into novel, specialized or higher-order rules.

In order to illustrate how the two dimensions of the classification scheme are oriented, a function by processes matrix is shown in Figure 2.

The classification of task descriptions was accomplished in three stages: (1) to analyze and classify elements of descriptive statements in terms of the categories of things, data, and people; (2) to analyze and classify elements in functional terms; and (3) to analyze statements to determine mental processes engaged in while performing the functions.

A simple example dealing with major engine tune-up might clarify these stages. Employing the letter and number format of the function by processes matrix as a coding system, analysis of the descriptive statement "Meet with customer to understand nature of problem," indicates that it should be classified according to both data B and people C categories. Analysis of the statement of data functioning places it in the category of compiling B4; analysis of the statement for people functioning places it in the speaking-signaling C3 category. When the compiling function of the statement is analyzed for processes, a mental process of coding can be identified 3; when the people function of speaking-signaling is classified it demands a discriminating or identifying process 2. Thus, according to Figure 2. the total classification of the statement in terms of data and people function and process results in a B4-3 category loading and a C3-2 loading in terms of people function-process.

MENTAL PROCESSES	What Workers Do (Function)																					
	Things A								Data B						People C							
	1.Handling	2.Feeding-Offbearing	3.Tending	4.Manipulating	5.Driving-Controlling	6.Operating-Controlling	7.Precision working	8.Setting up	1.Comparing	2.Copying	3.Computing	4.Compiling	5.Analyzing	6.Coordinating	1.Taking instructions-helping	2.Serving	3.Speaking-Signaling	4.Persuading	5.Diverting	6.Supervising	7.Instructing	8.Negotiating
1. Chaining or rote sequencing																						
2. Discriminating or identifying																						
3. Coding																						
4. Classifying																						
5. Estimating - Discrete cases																						
6. Estimating - Continuous																						
7. Logical manipulation																						
8. Rule using (if such & such, use-)																						
9. Decision making																						
10. Problem solving																						

Figure 2. Function by Processes Matrix

Some difficulties were experienced in classifying a statement in two or more functional areas (such as the above example in people and data functions.) The problem was in avoiding a pre-set classification bias which occured during first reading of the statement. Results of such a bias tended to structure analysis toward one functional area to the exclusion of others. A general classification principal developed here was to first systematically analyze a statement to determine which of the categories thing, data, and people were involved. Then to analyze the statement for function and process classification.

When basic task description statements had been classified and coded according to the function-process matrix the next step was to determine a technique for clustering.

Method of Clustering

The initial problem was centered around the grouping of task action descriptions so that clusters of common tasks and task patterns would emerge. This was accomplished in several steps. First, each basic task was compared with all other basic tasks to determine an index of similarity. Next, the variance of each basic tasks similarity indices was computed. Third, basic tasks which would serve as rotation points were determined on the basis of variance and similarity values. Fourth, basic tasks were formed into clusters around rotation points.*

Similarity Index

After all descriptive statements of actions for each basic task had been analyzed and classified as described above, an index of similarity was computed for each pair of basic tasks. This index was obtained by:

$$S(i,j)=\left[\frac{T_a(i_a,j_a)}{Ta(i_a)+Ta(j_a)-Ta(i_a,j_a)}+\frac{T_b(i_b,j_b)}{T_b(i_b)+T_b(j_b)-T_b(i_b,j_b)}+\frac{T_c(i_c,j_c)}{T_c(i_c)+T_c(j_c)-T_c(i_c,j_c)}\right]100$$

---

* The clustering technique described in this report is an adaption of a computerized system developed by Silverman (1966) for determining the basic technical skills required by naval weapons operation and support.

Where	$T_a(i_a, j_a)$	is the number of task actions classified under things function contained in both basic tasks i and j.
	$T_b(i_b, j_b)$	is the number of task actions classified under data function contained in both basic tasks i and j.
	$T_c(i_c, j_c)$	is the number of task actions classified under people function contained in both basic tasks i and j.
	$T_a(i_a)$	is the number of task actions classified under things function contained in job i.
	$T_b(i_b)$	is the number of task actions classified under data function contained in job i.
	$T_c(i_c)$	is the number of task actions classified under people function contained in job i.
	$T_a(j_a)$	is the number of task actions classified under things function contained in job j.
	$T_b(j_b)$	is the number of task actions classified under data function contained in job j.
	$T_c(j_c)$	is the number of task actions classified under people function contained in job j.

The denominators in the expression represent the total number of different task actions contained in i and j combined. Output from this formula produces values ranging from 300 (total agreement between basic tasks i and j) to "0" (complete difference between basic tasks i and j).

The following example shown the computation of a similarity index for two basic tasks in which $T_a(i_a)$ contains 3 task actions, T_b (i_b) contains 13 task actions, $T_c(i_c)$ contains 1 task action; and $T_a(j_a)$ contains 3 task actions, $T_b(j_b)$ contains 14 task actions; $T_c(j_c)$ contains 2 task actions.

$T_a(i_a)$ = A12, A75, A85

$T_a(j_a)$ = A12, A75, A85

$T_b(i_b)$ = B23, B37, B37, B42, B43, B43, B44, B47, B53,

$T_b(j_b)$ = B14, B23, B37, B37, B38, B42, B43, B43, B44, B47,

B54, B57, B67, B67

B48, B54, B57, B57

$T_c(i_c)$ = C32

$T_c(j_c)$ = C32, C33

In matching common task actions between basic tasks i and j in the above example for things functions (A), the connecting lines show all three loadings (A12, A75, A85) to be the same; for data functions (B), connecting lines indicate 11 task actions are common between i and j. One common task action occurs between i and j in the people functions (C). Applying the formula we get the following similarity index between basic tasks i and j.

$$S(i,J) = \frac{3}{3 + 3 - 3} + \frac{10}{13 + 14 - 10} + \frac{1}{1 + 2 - 1} \times 100$$

$$1 + \frac{10}{17} + \frac{1}{2} \times 100 = 209$$

By computing similarity indexes for every possible pair of basic tasks a matrix of mutual similarities is generated containing M (M-1 /2) distinct similarities, where M equals the number of basic tasks. This computation, although very tedious and time consuming when proceeded "by hand", can be easily facilitated using an iterative computer technique.

Some problems were encountered in adapting the similarity index to the aims of the research. To overcome the difficulties several rules dealing with weighting procedures were developed. They are as follows:

1. In similarity indexing, only a single entry is to be made for each two repetitious occurrances of the same classification loadings in a basic task.

2. When comparing two basic tasks each representing a different functional emphasis (e.g., basic task i = things and basic task j = data).

a. increase by one half the value of T(i) in the fraction representing the functional emphasis of the first basic task.

b. double the T(j) value in the fraction representing the functional emphasis of the second basic task.

c. halve the T(i,j) value and double the T(i) and T(j) values in the fraction denoting the remaining functional emphasis not represented in the two basic tasks being compared.

3. When comparing two basic tasks each representing the same functional emphasis (e.g., i=data and j=data), use all T (i), T (j), and T (i,j) values as they are.

The first rule was developed to reduce the total number of entries for repetitious occurrances of an action without losing the relative degree of emphasis for that action among all other actions in the task. For example, if basic task i had three occurrances of the classification B45, then, in terms of rule i, only one entry of B45 would be entered in the similarity index formula for comparison with another basic task. Similarly, if basic task i had five repetitions of the classification B45, then two entries of B45 would be entered in the formula.

Rules 2 and 3 were developed to account for differences in functional emphasis of jobs. Functional emphasis is used to mean the primary work function being engaged in the job in terms of things, data and people. For example, a machinist is functionally engaged primarily with things rather than data or people. On the other hand, the major functional emphasis of a draftsman is considered data, whereas a policeman's functional emphasis would be considered people.

The functional emphasis for each basic task was determined by judging what relative proportion the worker involved himself during the job with things, data, and people. The method employed in this research appears to represent the most precise approach currently developed. However, additional research is required to further refine classification procedures. The present methodology requires that each basic task be analyzed in a more or less logical manner to determine the relative proportionment of worker functioning devoted to things, data, and people. Additional information was sought from the DOT, Dictionary of Occupational Title (1965), and Occupational Outlook Handbook (1966) to assist in these judgments. Proportions were assigned simply on a high or low basis, the composite of which should theoretically sum to 100 per cent.

An example might clarify rule 2. When comparing two basic tasks i and j, in which basic task i represents a functional emphasis of things and basic task j of data.

Where $T_a(i_a) = 10 \qquad T_b(i_b) = 12 \qquad T_c(i_c) = 2$

$T_a(j_a) = 14 \qquad T_b(j_b) = 12 \qquad T_c(j_c) = 2$

$T_a(i_a, j_a) = 7 \qquad T_b(i_b, j_b) = 10 \qquad T_c(i_c, j_c) = 2$

Then $S(i,j) = \frac{7}{15+14-7} + \frac{10}{12+24-10} + \frac{1}{4+4-1} = 85$

In the first fraction, $T_a(i_a) = 10$ was increased by half to 15 in keeping with 1.a. above. The first fraction in the formula is the things fraction and task i in this example represents a things emphasis. In the second or data fraction following 1.b. above, $T_b(j_b) = 12$ was doubled to 24. In the third fraction representing people, which was not the functional emphasis represented in either basic task i or j, $T_c(i_c j_c) = 2$ was halved to 1, and $T_c(i_c) = 2$ and $T_c(j_c) = 2$ were both doubled to 4.

The following example demonstrates rule 3: comparing two basic tasks i and j when both represent the same functional emphasis (i.e., i and j = data).

When $T_a(i_a) = 10$ $T_b(i_b) = 12$ $T_c(i_c) = 2$

$T_a(j_a) = 14$ $T_b(j_b) = 12$ $T_c(j_c) = 2$

$T_a(i_a, j_a) = 7$ $T_b(i_b, j_b) = 10$ $T_c(i_c, j_c) = 2$

Then $$S(i,j) = \frac{7}{10+14-7} + \frac{10}{12+12-10} + \frac{2}{2+2-2} = 175$$

In this example, all values are treated in the functions just as they are.

Variance Calculation

One criterion for selecting rotation points (discussed below) was the variance of each basic task's similarity indices. The variance was computed by:

$$S^2 = \frac{\Sigma (X - \overline{X})^2}{n-1}$$

Where X = Similarity index of basic task i with basic task j, or S(i,j).

$\overline{X}$ = mean of similarity indices of basic task i

n = number of similarity indices of basic task i with all other basic tasks

An output of this step in the data processing was a variance listing for each basic task. A simplified example presented in Table 10, adapted from Silverman (1966, p. 10), shows the variance calculations of two basic tasks.

TABLE 10

Calculation of Variance for Two Sample Basic Tasks

Basic Task	Similarity Index X	$X-\bar{X}$	$(X-\bar{X})^2$	S^2
i	03	-17	289	
	20	0	0	
$\bar{X}$ = 60/3 = 20	37	17	289	
	X=60		578/2	= 289
j	15	-5	25	
$\bar{X}$ = 60/3 = 20	20	0	0	
	25	5	25	
	X=60		50/2	= 25

This example shows each basic task i and j having a mean similarity index of 20 and listed with similarity indices of three other basic tasks. The variance for i is 289 and for j is 25.

Rotation Points

In order to develop a method for grouping basic tasks it was necessary to establish a starting point; a point around which other basic tasks would group or cluster. Basic tasks meeting the criteria of having high variances and having relatively low similarity index values with other basic tasks with high variances were selected as rotation points. (RP).

High variance was used because it would indicate that the potential RP had both a relatively strong similarity of task actions with other basic tasks, as well as a pattern of task actions that greatly differed from those of other basic tasks. Such a combination would mean that some basic tasks would cluster around the RP whereas other basic tasks would not.

Table 5 shows the variance calculations for two basic tasks i and j. The variance of basic task i is 289, a relatively high value, indicating both high and low similarities with other basic tasks; the variance of basic task j is 25, a relatively low value, indicating a lack of any strength in similarity. Applying the criterion of high variance in the table, basic task i would be selected over j as a potential RP.

The second criterion of low similarity was employed in order to distinguish among various potential RP's having high variances. The similarity index designates the relative degree of similarity between any two basic tasks. Therefore, if RP's were selected having high variance and low similarities with other RP's, the greatest separation of clusters would occur. When two different basic tasks are highly similar (high similarity index) and both have a high variance the clusters formed around each will greatly overlap and are therefore made up of many of the same basic tasks. If, on the other hand, the two basic tasks are very dissimilar (low similarity index) and at the same time both have high variances, they will each cluster a set of basic tasks which are, in general, distinct and not overlapping with the other.

The following example demonstrates this point.

Basic Tasks	s^2
1	289
2	254
3	239
4	231

S (i,j)	
1,2= 40	2,3= 12
1,3= 08	2,4= 05
1,4= 37	3,4= 23
1,4= 37	3,4= 23

In the example, consider high variance (S^2) to be > 180; and a high similarity index S (i,j) to be 28. Basic tasks 1,2,3,4, each have a high variance and are listed in order in the left box. Similarity indexes of each basic task with each other basic task are shown in the right box. In order to distinguish which of these basic tasks would serve as best RP's it is necessary to combine information from both boxes. Basic task 1 has the highest variance so will automatically become an RP. Basic task 2 is next in order of variance. However, it shows high similarity with 1 thus does not meet the second criterion for RP and is removed from consideration. Basic task 3 qualifies with high variance and has a low similarity index with 1, 2, and 4 thus would become the second RP. This means, in effect, that basic task 3 would cluster a certain set of basic tasks different than that which basic task 1 would cluster. Finally, basic task 4 shows high similarity with 1 and therefore is discounted as a RP.

Clustering

The clustering function emerged out of the RP selection procedure. Rotation point selection required that each basic task be subjected to the two criteria stated above of high variance and low similarity. In accomplishing this, all basic tasks was ordered in terms of their variances and then judged for similarity. The first basic task listed automatically became the first RP. The next step consisted of selecting basic tasks whose similarity index with the first RP reached a certain magnitude. In this manner a cluster around the first RP emerged. The critical similarity index value for inclusion in a cluster in this research was set at ≥ 90. This value represents the minimum acceptable similarity and was established somewhat arbitrarily on the basis of the homogeneity of clusters achieved in this pilot effort. The variances of all basic tasks included in the first cluster were then set to zero, thus removing from consideration as RP's all basic tasks having high variances as well as high similarities with that RP.

The basic task having the next highest variance and a similarity index with the first RP of less than 90 became the second RP. A cluster was then formed around this point and their variances set to zero. In similar manner other clusters were formed until no further cluster could be formed. The example that follows demonstrates the clustering function.

Basic Tasks Ordered according to Variance

Basic Tasks	S^2
1	289 (RP_1)
2	241 (0-1)
3	203 (RP_2)
4	187 (0-1)
5	121 (0-3)
6	89 (0-3)
7	43 (0-1)
8	25

Similarity Index Values of Each Basic Task Pair

S (i,j)		
1,2= 40	2,7= 32	4,8= 10
1,3= 08	2,8= 11	5,6= 34
1,4= 37	3,4= 23	3,4= 23
1,5= 12	3,5= 39	5,8= 02
1,6= 02	3,6= 33	6,7= 20
1,7= 36	3,7- 12	6,8- 12
1,8= 07	3,8= 10	7,8= 15
2,3= 12	4,5= 07	
2,4= 18	4,6= 09	
2,5= 23	4,7= 29	
2,6= 25		

Clusters

RP	Cluster
1	2,4,7
3	5,6

In the example, basic task 1, having the highest variance, becomes RP_1. Similarity index values with 1 indicate that basic task 2, 4, and 7 meet the $\geq$ 28 criterion and therefore cluster with basic task 1. The variances of these basic tasks is set to zero (0-1). Basic task 3 has the next highest variance and a similarity index with 1 equal to 08, below the 28 criterion. Therefore, basic task 3 becomes RP_2 and forms a cluster with all basic tasks meeting the $\geq$ 28 similarity criterion; in this case basic tasks 5 and 6. Only basic task 8 could not be clustered. Inspection of the similarity indexes reveals that in no instance did 8 meet the $\geq$ 28 criterion. Therefore, in this small example, the lower left box shows two basic clusters have been formed: one containing basic tasks 1, 2, 4 and 7; and one containing basic tasks 3, 5 and 6. Basic task 8 would have to be considered unlike any other basic task included in this group thus requiring separate consideration.

Clustering Anticipated Jobs

Basically, the same procedure as that detailed above was followed in attempting to cluster jobs which were forecast but had not yet emerged. A small sample of jobs was selected and efforts to generate task descriptions with job incumbents and supervisory personnel of related jobs was attempted. The interview consisted of requesting the respondent to project what job(s) might emerge in the next five years in place of his job or in his firm as a result of newer technological advances; to select one basic task from a newly emerging job; and to describe each task action required in the work. He was asked to identify objects acted upon in the job, worker task actions, signals of completion of tasks, tools and equipment needed, and information guiding the actions. The method proved to be completely inadequate, and no significant outcomes were achieved. Results and faults in this approach will be discussed in Chapter V. Implications for a methodology to achieve positive outcomes in clustering projected jobs are discussed in Chapter VI.

Chapter V

Results and Discussion

Clustering System

Included in Chapter V are the outcomes of the development of the clustering system. Results will be presented in a general running narrative paralleling the exposition in chapter IV with tables and figures where necessary. It is hoped that Chapters IV and V will serve as a manual for those who may wish to replicate and/or apply the clustering technique.

Occupations

The initial step in the development of the system to cluster common jobs involved the identification of those occupations that met the selection criteria. Those occupations which satisfied the criteria are listed in Table 11 under the six broad occupational areas discussed earlier.

Table 11

List of Occupations

Mechanical:

- Machinist, tool and die, tool maker
- Welder
- Plumber
- Auto Mechanics
- Skilled Printing
- Machine Operator
- Cleaners and Pressers
- Furniture Manufacturing

Electrical:

- Electrician
- Lineman and Serviceman
- Electrical and Electronics Repair
- Electronics Installing

Table 11 (Continued)

Spatial-Structural:

- Draftsman
- Sheet Metal Worker
- Mason and Cement Worker
- Carpenter

Chemical-Biological:

- Laboratory Technician
- Cook
- Practical Nurse and Hospital Attendant
- Physician's and Dentist's Assistant
- Meat Cutter

Symbolic:

- Bookkeeper
- Machine Bookkeeper
- Clerical, General
- Office Machine Operator
- Secretary
- Switchboard Operator

People:

- Retail and Wholesale Salesman
- Insurance Salesman
- Waiter and Waitress
- Beautician and Barber
- Fireman
- Policeman
- Sales Clerk

From the occupations listed in Table 11, a sample of occupations was selected in order to test the feasibility of the clustering system. The sample was limited to the two broad areas of mechanical and electrical plus one occupation in the symbolic area. The occupations which were selected are shown in Table 12.

Table 12

Occupational Sample for Clustering System
Welder
Auto Mechanics
Skilled Printing
Electrician
Electrical and Electronics Repair
Draftsman
Sheet Metal Worker
Secretary

Sample of Jobs and Basic Tasks

Eighteen jobs were selected to represent the occupations listed in Table 12 One or two basic tasks were selected from each job to be described and analyzed. Table 13 lists jobs and basic tasks.

Table 13

Sample of Jobs and Basic Tasks

Job Title	Basic Task to be Described
1. Marine Draftsman	Develop drawings for submarine mothership
2. Mechanical Draftsman	Drawing layout from engineer's sketch
3. Electrical Draftsman	Lighting layout
4. Hydraulic Draftsman	Drawing pump case layout
5. Motor Truck Servicing	Airbrake relining
6. Motor Truck Servicing	Major tune-up
7. General Mechanic (automotive)	Major tune-up
8. General Mechanic (automotive)	Front transmission bearing replacement
9. Automotive Electrician	Major engine tuning

Table 13 (Continued)

10.	Automotive Electrician	Starter overhaul
11.	Motor Truck Repair	Major diesel tune-up
12.	Motor Truck Repair	Generator-voltage regulator system adjustment
13.	Sheet Metal Welder	Tack Welding
14.	Auto Body Repair	Radiator re-coring
15.	Auto Body Repair	Auto body welding repair
16.	TV-Radio Service	Home call TV repair
17.	TV-Radio Repairman	General TV service repair
18.	TV-Radio Repairman	Diagnosis and repair radio deficiency
19.	Electrician	Install florescent fixtures
20.	Printer	Hand/machine composition of blank forms
21.	Computer Systems Technician	Trouble shoot problem on 501 printer
22.	Computer Systems Technician	Weekly maintenance
23.	General Welding and Repair	Metallizing
24.	General Welding and Repair	Fabricating
25.	Welding and Repair	Boiler repair
26.	Welding and Repair	Fabricating
27.	Executive Secretary	Handling correspondence

Past clustering efforts have been attempted at the job level but have encountered considerable difficulty, particularly the variation in job titles. Table 13 presents a case in point. Note job titles 7, 8, 9, 10 for example. One incumbent entitled his job general mechanic (automotive), the other automotive electrician. Yet both perform the same basic task in their job: major engine tune-up. However, not until descriptions of both basic tasks are available can one be sure that both tasks require the same worker performance. The clusters that were formed in this research and presented later in the chapter reveal that both jobs were highly similar.

Task Description

The procedures for generating task descriptions for the twenty-seven basic tasks listed in Table 13 have been

Described earlier. The developmental goals were:

Task descriptions obtained should possess

1. "Fidelity in generation and translation of task information."
2. "Sufficient detail to avoid missing important worker functions and processes."
3. "Descriptions of the work requirements in a form translatable into the two dimensional classification scheme developed for classifying task actions."

Sources available for obtaining task information and the ratings of the task descriptions obtained from them are presented in Table 14.

Table 14

Ratings of Task Descriptions

Sources	Fidelity	Detail	Form
1. Job incumbents	High	Good	Good
2. Supervisors of Workers	Moderate	Moderate	Good
3. Vocational specialists	Moderate	Moderate	Moderate
4. Printed Materials	Moderate	Poor	Poor

The above data indicate that job incumbents were the best over all source for obtaining task descriptions. Supervisors of workers were rated next best. The poorest source was other printed materials; i.e., task descriptions from other studies, the Dictionary of Occupational Titles, and Occupational Outlook Handbook. In general, printed materials were not effective because: (1) semantic limitations prevented good translation, (2) descriptions were either too detailed or too abbreviated to permit adequate classification, and (3) the emphasis was usually slanted towards the physical aspects of the job, omitting descriptions related to mental processes.

Job incumbents were consistently more effective than any other human resource in generating task descriptions. They were obviously knowledgable about their job and readily supplied the information required. In most all cases, they were concerned to complete the interview in the least possible amount of time without deviating to other or unrelated areas of interest. This was not so with most supervisors and vocational specialists. They frequently extended the discussion into unnecessary areas. Supervisors and vocational specialists tended to be more suspicious and defensive than were incumbents requiring considerable patience and tact in the interview to get them to specify description of a particular basic task.

Task descriptions were developed for each one of the 27 basic tasks included in the study. Task descriptions for one basic task are shown in Table 15.

Table 15

Task Descriptions for a Basic Task
of the Job Draftsman

Jeppsen and Miller Architects	No. 3 Beard 9-30-66

TASK DESCRIPTION

Job Title: Draftsman

Task Name: Lighting layout for Linn County Court House

Object Acted Upon: Drawings

Information Guiding Action: Specifications from architect, Consulting firms and technical references.

Table 15 (continued)

Tools: Parallel bar, Draftsmen's triangle, various pens, pencils.

Actions: Executes a procedure.

Description of Task Actions

1. Meet with architect and customer to understand sketches and notes for layout job.
2. Analyze data and determine layout plan of action.
3. Procure needed drawing materials: paper, tools, references.
4. Secure paper to board.
5. From sketches and specifications provided, determine types and numbers of detail drawings required for total job.
6. Determine scale of layouts and plan locations on paper.
7. Calculate start point and draw on floor plan to scale.
8. Using specifications provided and found in references, determine light level requirements for all areas.
9. Translate light values into appropriate fixture types.
10. Determine exact placement of fixtures on basic plan.
11. Draw complete layout details for each component part.
12. Give completed drawings to lighting engineer and communicate necessary details.

Table 15 contains a description of the basic task of the draftsman developing a lighting layout. The statements contain elements of what thw worker does, what he does it to, and what he does it with. The upper left portion contains the source of the descriptions and the upper right portion contains the number of the description, who conducted the analysis, and the date.

The task descriptions for the basic task presented in Table 15 are representative of the task descriptions developed for all 27 basic tasks analyzed in this study. All task descriptions are contained in Appendix A.

Analysis and Classification of Task Descriptions

The outcomes of analyzing and classifying basic tasks resulted in function and processes loadings for each task. The classification loadings for one of the 27 basic tasks are shown in the left hand column in Table 16.

Table 16

Classification Loadings for Draftsman Basic Task of Lighting Layout for Linn County Court House

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Jeppsen and Miller
Architects

No. 3
Beard
9-30-66

TASK DESCRIPTION

Job Title: Draftsman

Task Name: Lighting layout for Linn County Court House

Object Acted Upon: Drawings

Information Guiding Action: Specifications from architect, consulting firms and technical references.

Tools: Parallel bar, Draftsmen's triangle, various pens, pencils.

Actions: Executes a procedure

Table 16 (continued)

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with architect and customer to understand sketches and notes for layout job.
B5-4, B6-7	2. Analyze data and determine layout plan of action.
B4-2, A1-2	3. Procure needed drawing materials: paper, tools, references.
A8-5	4. Secure paper to board.
B5-4, B6-7	5. From sketches and specifications provided, determine types and numbers of detail drawings required for total job.
B3-7, B6-7, B4-4	6. Determine scale of layouts and plan locations on paper.
B3-7, A7-5, B2-3	7. Calculate start point and draw in floor plan to scale.
B4-7, B4-2, B3-7	8. Using specifications provided and found in references, determine light level requirements for all areas.
B5-3, B4-4	9. Translate light values into appropriate fixture types.
B5-7, B6-8	10. Determine exact placement of fixtures on basic plan.
B4-3, A7-5	11. Draw complete layout details for each component part.
C3-2, B4-3	12. Give completed drawings to lighting engineer and communicate necessary details.

As can be seen in Table 16, task description statements usually contained more than one classification element. For example, description No. 7, "Calculate start point and draw in floor plan to scale," when analyzed contained three distinct elements: B3-7, A7-5, and B2-3. Translation of the loadings, according to Figure 2, as follows: B3-7 means that while the worker is functioning at computing, he is mentally making logical manipulations; A7-5 indicates that the worker is making discrete estimations while engaging in precision working; B2-3 designates the worker is engaged in a coping function while mentally coding. Total classification loadings for all 27 basic tasks are summarized in Appendix H , Table H-1.

In preparation for similarity indexing a rule was established to reduce the total number of classifications loadings when repetitions occurred.

Table 17 contains the total classification loadings for basic task No. 3 which was presented in Table 16. Application of the repitition rule resulted in a reduced number of classification loadings for basic task No. 3 as shown in Table 18. Comparing the entries in both tables, it can be seen that the total classification loadings for basic task No. 3 were reduced from four, twenty, and two to three, eleven, and one respectively for the functional categories A,B, and C. Such a reduction appears not to have biased basic tasks for clustering and does substantially reduce the data to be processed, particularly when considering involving large numbers of jobs. However further study of the effects of reduction must be made.

Table 17

Classification Loadings for Basic Task No. 3

Functional Category	Loadings	
A	12, 75, 75, 85	4
B	23, 37, 37, 37, 42, 42, 43, 43, 43, 44, 44, 47, 53, 54, 54, 57, 67, 67, 67, 68	20
C	32, 32	2

Table 18

Classification Loadings for Basic Task No. 30

Treated for Repetitions

Functional Category	Loadings	
A	12, 75, 85	3
B	23, 37, 42, 43, 44, 47, 53, 54, 57, 67, 68	11
C	32	1

Classification loadings for all basic tasks when subjected to the repetition rule are summarized in Appendix H Tables H-2, H-3, and H-4 according to functional categories of things (A), data (B) and people (C), respectively.

Similarity Index

Similarity indexes were computed for each pair of basic tasks. A matrix containing 351 similarities is shown in Table 19.

The highest similarity S (i.j.) = 250, occurred between basic tasks 23 and 24. The lowest similarity was 9 occurring between basic tasks 2 and 22, and between 4 and 22.

Variance Values

The variance of each basic task's similarity indices is listed in Table 20 in numberical order.

Table 20

Variance Listing for Each Basic Task

Basic Task	S^2	Basic Task	s^2
3	3472	20	1359
4	2857	16	1224
8	2626	25	1187
1	2542	18	1172
9	2489	6	1097
10	2438	17	1043
11	2288	5	943
14	2260	21	930
2	2186	26	877
23	2155	13	820
15	2110	19	626
24	2056	22	530
12	1730	27	352
7	1460		

Table 20 shows that basic task 3 had the highest variance, thus indicating that it had the greatest and the least similarity of tasks with certain other basic tasks in the group. Basic task 27 shows a variance of 352, the smallest listed variance and the basic task least similar to all other basic tasks.

Basic tasks to serve as RP's for clustering were determined and are shown in Table 21.

Table 19

Similarity Matrix Comparing All Pairs of Basic Tasks

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	180	205	168	35	28	33	35	33	41	41	39	33	35	47	28	38	23	26	29	19	17	28	43	27	33	78
2		200	175	36	29	26	35	29	36	42	39	27	35	34	29	41	26	33	28	19	10	26	47	35	34	78
3			222	33	31	30	34	28	35	45	42	29	29	37	25	38	22	26	21	19	9	32	47	38	35	85
4				27	26	32	32	32	34	40	41	16	30	33	21	34	20	22	34	20	9	27	40	32	31	83
5					110	66	106	115	92	134	75	71	33	25	56	62	29	41	58	40	63	44	58	61	55	17
6						83	125	114	97	145	91	108	74	39	47	60	45	41	88	50	75	59	75	97	82	40
7							143	173	143	114	97	90	97	76	106	88	85	53	103	46	36	103	102	68	59	45
8								189	183	156	111	103	162	194	79	85	61	54	97	45	46	72	75	69	66	38
9									174	148	105	79	168	137	80	76	66	71	86	39	45	71	78	64	53	37
10										160	155	107	202	169	88	94	88	71	110	70	63	75	70	83	76	48
11											200	72	135	128	58	72	77	80	177	62	60	82	97	84	61	30
12												50	139	103	70	98	78	99	172	79	67	78	99	68	73	35
13													95	108	69	63	38	35	57	40	55	85	90	82	67	26
14														158	84	78	67	79	86	66	55	80	95	66	70	33
15															54	73	93	73	94	55	59	104	126	107	80	38
16																172	105	85	73	96	53	103	116	87	101	35
17																	67	105	67	85	52	92	107	79	94	32
18																		66	84	75	48	134	160	89	94	46
19																			74	119	60	58	71	53	57	37
20																				94	60	91	98	94	91	50
21																					95	102	101	99	105	36
22																						69	76	78	76	20
23																							250	142	102	28
24																								150	123	45
25																									152	44
26																										35

Table 21

Determining Rotation Points

Basic Tasks	S^2	RP	$S(i,j) \geq MS$	Basic Task	S^2	RP	$S(i,j) \geq MS$
3	3472	RP_1		20	1359		2
4	2857		1	16	224		3
8	2626	RP_2		25	1187		3
1	2542		1	18	1172		3
9	2489		2	6	1097		2
10	2438		2	17	1043		3
11	2288		2	5	943		2
14	2260		2	21	930		2
2	2186		1	26	877		3
23	2155	RP_3		13	820		2
15	2110		2	19	626		-
24	2056		3	22	530		-
12	1730		2	27	352		-
7	1460		2				

As seen in Table 21, basic task 3 became the first RP. Basic tasks 4,1, and 2 reached MS with basic task 3 therefore had their variances set to zero and were disqualified as RP's. Basic task 8 became RP_2. Basic tasks meeting MS with 8 included 9, 10, 11, 14, 15, 12, 7, 20, 6, 5, 21, and 13 and were removed from consideration as RP's. The basic task having the next highest variance was 23 and thus became RP_3. Basic tasks 24, 16, 25, 18, 17, and 26 met the MS with basic task 23 and their variances were set to zero. No further RP's emerged from the three remaining basic tasks.

It should be pointed out that no hierarchy exists in RP's. The sub-scripts 1, 2, 3, etc. are employed merely to keep RP identities separate and serve no other function.

Any basic task identified as an RP is equal to all other RP's as a clustering point. The number of basic tasks similar to any one RP is in no way related to the potential of a basic task to become an RP.

Clusters

Clusters formed around the three RP's are presented in Table 22.

Table 22

Cluster Listing

Cluster	RP	Basic Tasks Clustered
1	3	4,1,2
2	8	9,10,11,14,15,12,7, 20,6,5,13
3	23	24,16,25,18,17,21,26

As shown in Table 22, the first cluster was formed around RP 3 and includes three basic tasks. The largest cluster was formed around basic task 8 and contained 11 basic tasks. Basic task 23 emerged as a third RP and clustered seven basic tasks around it.

Three basic tasks, 19, 22, and 27 were not included in either of the three clusters formed nor did they qualify as RP's. Therefore, they remained unclustered and as far as the small sample of jobs included in this pilot study, would have to be given individual attention with respect to vocational education program planning.

Table 23 presents job titles and basic tasks combined in the first cluster.

Table 23

Job Titles and Basic Tasks in Cluster 1

Job Title	Basic Tasks
1. Electrical Draftsman	Lighting layout
2. Hydraulic Draftsman	Drawing pump case layout
3. Marine Draftsman	Develop drawings for submarine mothership
4. Mechanical Draftsman	Drawing layout from engineer's sketch

The first cluster was made up of drafting jobs, as shown in Table 23 Inspection of Table 15 reveals that basic tasks in this cluster were very homogeneous but, with one exception, were very unlike all other basic tasks included. The one exception was basic task 27, executive secretary, which approached but does not reach similarity criterion. This means that at least a portion of the task actions of executive secretary were like that of draftsman task actions and might warrant closer inspection in terms of instructional planning.

Job titles and basic tasks combined in the cluster 2 are presented in Table 24.

Table 24

Job Titles and Basic Tasks in Cluster 2

Job Title	Basic Tasks
1. General Mechanic (automotive)	Front transmission bearing replacement
2. Automotive Electrician	Major engine tuning
3. Automotive Electrician	Starter overhaul
4. Motor Truck Repair	Major diesel tune-up
5. Auto Body Repair	Radiator re-coring
6. Auto Body Repair	Auto body welding repair
7. Motor Truck Repair	Generator-voltage regulator system adjustment
8. General Mechanic (automotive)	Major tune-up
9. Printer	Hand/machine composition of blank forms
10. Motor Truck Servicing	Major tune-up
11. Motor Truck Servicing	Airbrake relining
12. Sheet Metal Welder	Tack Welding

The second cluster, as shown in Table 24, consisted of basic tasks primarily drawn from automotive and truck repair jobs. Two exceptions to these job areas were basic tasks 13--sheet metal welder--and 20--printer. Logical reasoning would suggest the inclusion of sheet metal welder as part of the third cluster, to be discussed next, rather than the second cluster. However, when the specific task descriptions of sheet metal welder dealing with tack welding were analyzed, worker performance proved were more like those of cluster 2 than cluster 3. Perhaps if more basic tasks of sheet metal welder were analyzed these results would change.

The other exception, printer, was more unexpected. However, in terms of the limited sample of jobs involved and the resulting three clusters identified, the worker requirements for printer were most closely related to those represented in cluster 2.

Cluster 3 included basic tasks drawn from jobs related to job areas of electronics and welding repair and are listed in Table 25.

Table 25

Job Titles and Basic Tasks in Cluster 3

Job Title	Basic Tasks
1. General Welding and Repair	Metallizing
2. General Welding and Repair	Fabricating
3. TV-Radio Service	Home call TV repair
4. Welding and Repair	Boiler repair
5. TV-Radio Repairman	Diagnosis and repair radio deficiency
6. TV-Radio Repairman	General TV service repair
7. Computer Systems Technician	Trouble shoot problem on 501 printer
8. Welding and Repair	Fabricating

Although strength of similarity between electronics type jobs and welding repair jobs was generally minimal, as shown in Table 19, sufficient similarity occurred for these jobs to cluster. As was noted earlier, however, the inclusion for analysis of a larger sample of jobs and basic tasks might change these results.

Clustering Projected Jobs

Efforts to cluster future job projections were, in general, unsuccessful. The major breakdown occurred in generating descriptions of task actions. Projected jobs selected for attempted clustering along with the basic tasks identified for each are listed in Table 26.

Table 26

Projected Jobs and Basic Tasks

Job Title	Basic Tasks
1. Data transmission - Banking	Bank service network
2. Electronic fabricating	Installing communications equipment in mobile platform
3. Telephone repair - future	Repair telephone service
4. News information dissemination	Systems maintenance check

Inspection of Table 26 reveals job titles not totally unlike those now being used. Similarly basic tasks are not foreign sounding. The outstanding fact emerging from this very limited effort to generate projected job clusters was that future jobs are, in all likelihood, not going to be measurably different than those that now exist. What appeared to be the primary difference was in the alignment of basic tasks in jobs. Many of the basic tasks we now identify as being combined in present jobs will probably distribute under emerging job titles in different and various arrays. Another way of saying this is that newly emerging jobs will probably be composed of many basic tasks that have come from different older jobs plus some newly developed basic tasks unique to the new job. The importance of this fact is in the need to develop a system of clustering at the task level rather than at the job level.

Attempts to obtain task descriptions for basic tasks listed in Table 26 were unsuccessful from both job incumbents and supervisory personnel. It was found from the small sample encountered in this effort that job incumbents were completely unable to make future projections of worker requirements. They are apparently so close to their own job demands that technological advancements occurring in and near their job field have no specific meaning in terms of changes in their own job performance.

Supervisory personnel, on the other hand, were generally better able to project job change requirements in terms of worker performance. However, they were not able to provide comprehensive statements of sufficient detail to generate meaningful task descriptions. They had an understanding of general information of changing trends but were unable to draw upon technical details outside their immediate occupational field to define the functional aspects of what the worker of new job potentials in their own firm would do.

Chapter VI

Summary, Conclusions and Implications

This study has sought to attain the following objectives:

1. To develop and evaluate data gathering instruments for continuous assessment of human resources, employment opportunities, and educational and training programs.
2. To develop a system for assessing job opportunities that cluster the common skill and knowledge factors required in the job.
3. To develop manuals of procedures for field personnel to administer the data gathering instruments and to employ the clustering system.

Data Gathering Instruments

Seven instruments were developed to assess human resources, employment opportunities, and vocational and training programs in Oregon. The basis for developing the instruments derived from an analysis of a series of broad questions posed by the Oregon State Coordinating Committee on Systematic Planning for Vocational Education. The instruments were tested on an individual basis with representative subjects and were modified until reliability, validity, and usability were judged adequate. The seven instruments included a student questionnaire designed for use with secondary and post high school (non-baccalaureate) students, a dropout questionnaire designed for use with students who had dropped out of secondary school, an employee questionnaire designed for both employed and unemployed workers, an employer questionnaire designed for use with occupational establishments, a secondary school questionnaire designed for use with secondary school vocational programs, a community college questionnaire designed for use with community college vocational programs, and a proprietary school questionnaire designed for use with proprietary school vocational programs.

Institutions and agencies in Oregon already established in collecting and storing certain data considered appropriate to the study were identified and screened for acceptability. Such sources were classed as secondary and were included in the hopes that the data yield would meet the study criteria and thus provide a more efficient use of available data. Guidelines in the methods of administering data gathering instruments and collecting data from secondary sources were prepared.

Results of field testing the instruments suggest they are appropriate for surveying the populations intended in subsequent phases of the Planning, Implementation and Evaluation (PIE) study. However, field test samples were limited to representative individuals and small groups of individuals and did not include intact systems; i.e., a total school district, or a complete industrial firm, etc. Consequently, the guide developed for field personnel to utilize the instruments in later phases of the PIE study has not been tested out in intact situations. Additional field testing of the instruments should be accomplished in intact systems representative of the systems to be included in subsequent phases of the study.

Results of the effort to identify secondary sources in Oregon from which data could be extracted proved to be discouraging. It became apparent that not only are great quantities of data systematically collected from individuals and institutions in the state but these efforts are duplicative; i.e., the same information is gathered from the same individuals and institutions by many different secondary sources. Furthermore, these data are coded, recorded, and stored in a variety of forms and modes making it virtually impossible for the data to be extracted and used by others. Vast amounts of money and manpower are, in effect, wasted because no cooperative system of data storage and retrieval providing for common sharing is available at the state level. If a central data depository were established at the state level, all state agencies could efficiently store and retrieve data, and perhaps what is more important, would measurably reduce the occurrences of redundantly seeking the same data from the same sources.

Clustering System

A two dimensional system for clustering jobs was developed which combined worker functions and worker processes. Worker function is concerned with what a worker does during the job with respect to things, data, and people. Worker processes is concerned with what mental processes workers engage in while working with things, data, and people and includes such dimensions as rote sequencing, identifying or discriminating, coding, classifying, estimating, logical manipulating, rule using, decision making, and problem solving.

Task descriptions were developed for 27 basic tasks which were drawn from a specific set of selected jobs. The task descriptions were classified on the basis of the worker function-process scheme. Similarity indexes and variances were then computed for each basic task. Rotation points were determined on the basis of variances and similarity indices from which clusters of common jobs were formed. Detailed explanation and examples were provided as a guide for replicating and applying the clustering system.

Efforts were also made to cluster future job projections; however, the inability of job incumbents and supervisory level persons to generate basic task descriptions prevented any opportunity to apply the clustering system. Full cooperation was found in most instances but knowledge of sufficient technical details of task skills related to anticipated jobs was lacking, making it impossible for comprehensive descriptions to emerge.

With respect to generating task descriptions of current jobs, the evidence indicates that supervisory level and vocational education personnel are less effective than job incumbents. This would suggest the need to concentrate on methods of obtaining task descriptions from job incumbents. Additional study should be attempted to determine what type worker, under what types of conditions, is most productive in producing the desired descriptions.

A critical step in developing the clustering system centered around the establishment of numerical loadings for task actions. Numerical loadings were determined from the analysis and classification of task actions according to the function by process matrix. Although this structure served to produce clusters having high face validity from the limited sample of jobs employed in the study, replication of the system with a much larger sample of jobs is needed before a generalizable conclusion can be made.

Even though the outcomes of fixing numerical loadings suggest that the method will produce valid clusters, certain difficulties were experienced in classifying task actions from which numerical loadings were assigned. The difficulty centered around adequate working criteria by which raters can reach classification agreement. For example, as employed in this study, one of the higher functional categories of working with things was that of precision working. Criteria for classifying tasks at the level of precision working include two worker performances: considerable judgment and low tolerance limits. Two problems emerge. First, these criteria are, at best, vague leaving considerable subjective judgment to the rater in classifying task actions to a particular functional level; second, task actions of different jobs meeting classification criteria that place them at the same functional level often bring together job actions of a wide degree of difference.

An example of the first type problem can be seen in classifying certain task actions performed by a machinist in operating a lathe. Employing the classification criteria used in this study and depending upon the bias of the rater, these task actions could either be classified at the sixth functional level of things--operating-controlling--or at the seventh functional level--precision working.

An example of the second type problem emerges when it becomes apparent that the jobs of watchmaker and tool-and-die maker both contain task actions meeting the criteria of precision working. Obviously certain common actions are operating in both jobs regarding making certain types of judgments and dealing with certain low degrees of tolerance; however, other task actions in these same two jobs represent a considerable difference, but still qualify as precision working, such as the applying of force, finger dexterity, speed of hand movement, etc.

Both of these problem types indicate that the functions hierarchies as used in this study are not sufficient to handle comprehensive task action classifications. Additional study must be undertaken to develop more exact criteria for classification and to refine functional levels to handle greater variation within levels.

With respect to the clusters formed in the study, it should be made clear that these clusters emerged on the basis of including task action description of only a signle basic task selected from each of the 27 jobs sampled. However, these jobs each tend to be composed of several basic tasks, rather than just one, which, if all were included for clustering, might produce other clusters of jobs than those which occurred in this developmental effort. This suggests a need to determine the clustering influence of combining the several basic tasks in a job. For example, the first cluster to emerge in the study grouped together four different types of draftsman jobs. If all basic tasks in each of the four drafting jobs had been described and included for clustering, rather than just one from each, the chances seem likely that all four of these jobs might have clustered in a different way.

The implication for planning vocational training programs based on input obtained from this clustering system is that it could lead to the implementation of curricula having a much broader base than is presently the case. In other words, the various curriculums formed would meet the common needs of a broader cluster of jobs. Such curricula would efficiently prepare students with a fundamental competency appropriate to a variety of jobs rather than just one, as well as better preparing them to shift into alternative job opportunities as their current jobs are destroyed by technological advances.

With respect to projected jobs, the system developed in this study was unable to form any clusters because projected job task descriptions could not be generated. The method employed to describe task actions of projected jobs was the same as that used to generate task descriptions of current jobs. There is little doubt in the writer's mind that once task descriptions of projected jobs have been written, classification loadings and subsequent clusters in the manner developed in this study could then be readily accomplished.

The most promising source for generating projected job task descriptions appears to be supervisory and management level personnel in occupational firms. However, as was apparent from the study, this source by itself was insufficient. It is suggested that some form of team effort might be more successful. If a technical specialist who was well read in the technical journals and future trends of the general subject field represented in the firm in question was included as a team member along with the trained interviewer, the combined insights of such a team might be extremely fruitful in generating the desired task descriptions.

A final word needs to be said regarding computer application. Although this study did not employ computer processing in developing the clustering system, the numerical manipulation employed in generating the clusters were adapted after the work of Silverman, whose study is specifically concerned with the application of computer techniques to clustering (1966). Therefore, the clustering system developed in this study can be computerized using Silverman's model with only minor modifications.

References

Altman, James W. *Research on General Vocational Capabilities (Skills and Knowledges)*. Final Report. American Institutes for Research, Pittsburgh, Penn., March 1966.

Brookover, Wilbur, and Sigmund, Nosow. A sociological analysis of vocational education in the United States. In *Education for a Changing World of Work*. Appendix III. Washington, D.C.: U. S. Department of Health, Education and Welfare. 1963.

Bureau of Employment Security. *Dictionary of Occupational Titles*, Vols. I and II, U. S. Department of Labor, 1965.

Clark, Harold F. The economic and social background of vocational education in the United States. In *Education for a Changing World of Work*. Appendix III. Washington, D.C.: U. S. Department of Health, Education and Welfare, 1963.

Cotterman, T. E. *Task Classification: An Approach to Partially Ordering Information on Human Learning*. Dayton, Ohio: Wright Air Development Center, January, 1959 (WADC Technical Note 58-374).

Davis, Louis E. Effects of Automation on job design. In *Industrial Relations--A Journal of Economy and Society*. Institute of Industrial Relations. Regents of University of California. Berkeley: University of California Press. Vol. 2, 1962.

Drucker, P. F. *Landmarks of Tomorrow*. New York: Harper, 1959.

Illinois Governor's Committee on Unemployment. *Economic Growth, Equal Opportunity, Research*. Springfield, Illinois: Illinois Information Service, 1962b.

Illinois State Department of Labor. *Illinois Job Seekers' Survey*. Vols. 1, 2. Chicago: Research and Statistics Section. 1962a.

Kaugman, J. J. Vocational education: two year study. *Industrial Arts Vocational Education*, 1965, 54, 10.

Lane County Vocational educational needs. In *A Blueprint for Action*; Vol. I and II. Eugene School District #504-C; Eugene, Oregon: 1957.

Michael, Donald. Cybernation: The Silent Conquest. Santa Barbara, California: Center for the Study of Democratic Institutions, 1962.

Miller, R. B. A Suggested Guide to Position - Task Description. Lowry Air Force Base, Colorado: Armament Systems Personnel Research Laboratory, April, 1956. (ASPRL TM 56-6)

Miller, R. B. Task description and analysis. In R. M. Gagné (Ed.), Psychological Principles in System Development. New York: Holt, Rinehart & Winston, 1962.

Oregon State Department of Education. A Guide to Making Application for State Funds for School Buildings for Community Colleges and Education Centers, Division of Vocational and Post High School Education, Salem, Oregon: 1961a.

Oregon State Department of Education. Community Colleges for Oregon: A Plan for the 60's. Salem, Oregon: 1961b.

Shartle, C. L. Occupational Information. Englewood Cliffs, N.J.: Prentice-Hall, 1959.

Silverman, Joe. A Computer Technique for Clustering Tasks. U. S. Naval Personnel Research Activity, San Diego, California, 1966 (Tech. Bull. STB 66-23).

Smith, R. G. The Development of Training Objectives. The George Washington University: Human Resources Research Office, Va., June 1964. (Research Bulletin II).

Snyder, Edgar L.; Fink, C. Dennis; and Trexler, Robert C. Methods of recording and reporting task analysis information. In Uses of Task Analysis in Deriving Training and Training Equipment Requirements. Behavioral Sciences Laboratory, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio, December 1960. Technical Report 60-593).

Stolurow, L. M. The Classification of Learning Tasks: A Systems Approach. University of Illinois: Training Research Laboratory, 1960 (Memo Rep. 12).

State of Oregon. Technological Change and its Impact on the Oregon Labor Force. Department of Employment, Salem, Oregon, November 1966.

U. S. Department of Labor. Occupational Outlook Handbook. Washington: U. S. Government Printing Office, 1966-67.

Van Tries, R. P. Status report on industrial education in Minnesota, Industrial Arts Vocational Education, 1964. 53, 18-19.

Venn, Grant. Man, Education, and Work. Washington, D.C., American Council on Education, 1964.

Wirtz, W. Willard. Statement before the Subcommittee on Education, Senate Committee on Labor and Public Welfare, on 5.580, National Education Improvement Act of 1963, April 3, 1963.

APPENDIX A

Questions Related to Vocational Education Program Planning Compiled by the Oregon State Coordinating Committee on Systematic Planning for Vocational Education

Appendix A

Listing of Questions Related to Vocational Education Program Planning

A. What are characteristics defining categories of actual and anticipated job clusters?

(1) What types of activities are required? (manual, clerical, professional)
(2) What types of skills are required?
(3) What types of social interactions are involved? (solitary, group)
(4) What types of relationships are involved? (intra-organizational, inter-organizational, public, private)
(5) What types of social structures are involved? (bureaucratic, non-bureaucratic, independent work stations, assembly line, service activities)
(6) What physical demands are made?
(7) What physical conditions of work exist?
(8) What potential job satisfactions are offered?
(9) What economic returns of the occupation are expected?
(10) What degree of stability does the job have? (Is it affected by economic fluctuations?)
(11) What power potential does the job offer? (Does it require supervising others? being supervised?)
(12) What is potential for creativity? (Does job call for initiative, conformity?)
(13) What kind of knowledge is required? (areas of knowledge?)
(14) What kind of thinking is required? (convergent? divergent?)

B. What are preconditions for occupational entry?

(1) What type of training is needed?
(2) What skills are required? What knowledge?
(3) What mental ability, physiical attributes, personality characteristics are required?
(4) What basic education is needed?
(5) What ascriptive elements characterize occupational selection? (Who controls entry? class/race/other restrictions?)
(6) What psychological orientation is required?

C. What are extra-occupational variables of the job?

(1) What is prestige factor?
(2) Who holds power within occupational structure?
(3) What are boundaries around occupation in terms of mobility into and out of occupation?
(4) What is relationship of occupation to other occupations or to occupational family?

D. What is actual occupational inventory and what changes or shifts are anticipated and when are they expected.

(1) What are employment demands by individual occupation? (actual, anticipated)
(2) What is employment demand by occupational group? (actual, anticipated)
(3) What is employment demand by occupation and occupational group in geographic regions? (actual, anticipated)
(4) What is employment demand by occupation and occupational group in economic areas? (actual, anticipated)
(5) What jobs are open? (actual)
(6) What job clusters are expected to emerge? (anticipated)
(7) What are skill requirements for emerging job clusters?
(8) How many openings are there for each job? (actual, anticipated)
(9) What are entrant numbers by type of firm? (actual, anticipated)
(10) What is size and nature of human resources? (actual, anticipated)

E. What are characteristics of workers?

(1) Aspirations of in-school youth? (9th, 12th grades)
(2) Intentions to remain in area? (in-school youth, out-of-school youth, adults)
(3) Willingness to relocate? (in-school youth, out-of-school youth, adults)
(4) Willingness to modify expectations? (in-school youth, out-of-school youth, adults)
(5) Needs, interests, abilities? (in-school youth, out-of-school youth, adults)
(6) Personality characteristics? (in-school youth, early school leavers, employed adults, potentially employable adults, displaced workers, housewives)

F. What are major trends expected?

(1) Economic conditions of employment?
(2) Social conditions of employment?
(3) Psychological changes of workers?
(4) Pattern of occupational structure?
(5) Shifts in population (demographic changes)?

APPENDIX B

Information Needs for Instrument Development

Appendix B

Information Needs for Instrument Development

1. Human Resources (Current and Projected)
    - A. Population Characteristics

      (Total Population of Survey Area)

        1. Age
        2. Sex
        3. Marital Status
        4. Occupation by Category and specific job

           (Total Population 13 & over)
        5. Residence (current) Total Population 13 & over (by City, County, Urban, Rural)
            - a. Length of time in residence (present)
            - b. Length of state residence
            - c. Previous residence (Inter & Intra State Moves)
            - d. Anticipated preference of residence
        6. Education (Current and Projected)
            - a. General Education
                1. Years of School completed
                2. Currently a student
                    - a. Institution attending
                    - b. Estimated effect upon gaining and holding employment

(Continued I-A)

- b. Area of specific preparation
  (Total population 18 & over) (By occupation)
  - 1. When & where completed
  - 2. Type of Training institution
  - 3. Area of preparation emphasis
    (specific courses completed)
  - 4. Anticipated Vocational preparation
- c. Achievement Level (Total Population 13 & over)
  - 1. In general education
  - 2. In specific preparation for job
- d. Courses beneficial to job preparation
  (Total population 18 & over &/or employed)
  - 1. General Education
  - 2. Specific preparation

B. Employment History
(Total Population 13 & over)

- 1. Current Status
  - a. Employed: Full time - Part time
  - b. Unemployed
  - c. Length of time employed - unemployed
- 2. Current job (Occupation & job)

(Continued I-B)

3. How obtain job

   (Hiring and Selection practices)

4. Previous job held (occupation & job unemployed)

5. Reason for unemployment

6. Job changes during "N" years

   (Occupation and job)

   a. Length of time in each job

   b. Inter & Intra categorical shifts

7. Reason for changes

8. Adjustment problems observed

9. Anticipated job changes

10. Anticipated early withdrawal from present occupation & job

    a. Reason

11. Anticipated employment after retirement

    a. General &/or specific occupation or job preferred

    b. Full time - part time employment

C. Job Satisfaction or Dissatisfaction

(Total Population 13 & over)

(Employed and Unemployed)

1. Satisfied - Dissatisfied

(Continued I-C)

2. Reasons for Number 1.
    a. Effect of Working Conditions
    b. " " Interpersonal relationships
    c. " " Training & preparation
    d. " " organizational environment
3. Job security
4. Willingness to modify expectations
    (Implications of satisfaction factors for training & employment)

D. Aspirational Level
    (Total population 13 & over)
    1. Occupational area & job
    2. Level of aspirations
        (Specific job & occupation)
    3. Reason for interest

E. Abilities and Aptitudes
    (Total population 13 & over)
    1. Individual assessment
    2. Individual assessment of ability to meet aspirational goals

II. Job Data (Current & Projected)

A. Jobs and Occupations (Current) (Total Survey area)

(Continued II-A)

1. Occupations represented in the area
2. Jobs within occupations

   (Number and specific title of each)
3. Tasks performed in job

   (Number and type) (Cluster related)
4. Skill and preparation requirements of each task and job
5. Mental, Physical, personality characteristics required.

   Psychological orientation required.
6. Job openings presently unfilled

B. Labor Force (Current)

1. Number of Employees holding jobs
2. Skills and preparation possessed by employees holding jobs
3. Performance &/or competence level of employed workers.
4. Number of Unemployed workers (Human Resources)
5. Skills and preparation of unemployed workers
6. Number of workers needed in each occupation and job to fill openings (current demands)
7. Number of replacements needed for each occupation (projected)

(Continued II-B)

8. Labor surpluses by occupation and job

C. Hiring Practices (Current)

(Private Industries, Govt. Agencies)

1. Acceptable Minimum Qualifications by job
2. Desired Qualifications by job
3. Methods used to obtain qualified personnel
4. Promotional Practices as a means of filling vacancies
5. Screening Practices - Methodology (As used in No's 3 & 4 above)
6. Impediments to obtaining qualified personnel (Contracts, Agreements, etc.)
7. Satisfaction of employers with trainees of Oregon Vocational Programs

D. Anticipated Job Changes

(Alterations within existing jobs that will not change job, itself)

1. Occupational field and specific job
    a. Tasks, added, deleted, &/or performance altered
    b. New tasks to be performed (Number and type)
    c. Skill and preparation necessary for new tasks
    d. Estimated date of change

(Continued II-D)

        - e. Estimated period of transition
        - f. Estimated duration of new job
        - g. Anticipated hiring practices & requirements for changed jobs.
    - 2. Estimated Jobs eliminated
- E. Anticipated New Jobs (Created)

  (Predicted trends in jobs, products and processes)
    - 1. Occupational field and specific job
        - a. Tasks to be performed (Number and type)
        - b. Skill and preparation necessary
        - c. Estimated date of change
        - d. Estimated period of transition
        - e. Estimated duration of new job
        - f. Anticipated Hiring practices and requirements for new jobs
    - 2. Estimated Jobs eliminated
- F. Anticipated Labor Force

  (Possible inclusion in section 1 on Human Resources)
    - 1. Sources and quantity of supply
        - a. Entrant
            - 1. High School graduate
            - 2. High School drop out

(Continued II-F)

            3. College graduate
            4. College dropout
            5. Vocational School graduate (Inc. Community College)
            6. Armed Services Trainee (Veteran)
        b. Re-entrant (Veteran, Housewife, Retiree)
        c. Migrant
            1. Interstate
            2. Intrastate
            3. Foreign
    2. Characteristics of above (Of Human Resources)
        a. Age, Sex, Education, etc.

III. Vocational Education Programs (Non-Baccalaureate Level)

- A. Existing Programs
    - 1. Programs by curricula area and course offerings
        - a. Community College
        - b. Private School
        - c. Secondary School
        - d. Apprenticeship Program
    - 2. Scope and sequence of Curricular areas
        - a. Course Offerings

(Continued III-A)

- b. Criterion for offering course
- c. Objectives (skills & knowledges)
    - 1. How determined
- d. Organizational factors
    - 1. Full time - Part time
    - 2. Employment - Pre-employment
    - 3. Apprenticeship
    - 4. On-The-Job
    - 5. Re-training
    - 6. Duration: 6 Mos., One year, Two years
- e. Methods of Instruction (Consistency)
    - 1. Techniques, procedures, activities
- f. Methods of Evaluation
    - 1. Techniques
- g. Criterion for Success
    - 1. Students placed on job
    - 2. No. Completing Course
    - 3. Success of applicant on job
- h. Period of time course (has been - will be) offered

3. Location of training institution
    - a. institution, City, correspondence, etc.

(Continued III-A)

4. Agency Offering (Course - Program)
    a. Public & Private schools, industry, Govt.
5. Financial Support
    a. Tuition, Fees, State, Federal, Industry, Labor Organ.
6. Entrance Requirements
    a. Selection & Screening practices
7. Course Enrollment & Average Class Load
    a. No - enrolled in curr.
    b. No - enrolled in ea. course
8. Characteristics of Students (Human Resources)
    a. Age, Sex, Educational Level, Aspirations, etc.

B. Existing Facilities (Adequacy for Existing & Projected Programs)

1. Facilities Currently in Use
    a. High School
    b. College
    c. Private Schools
    d. Industry
2. Location of Facilities (Address).
3. Instructional Materials and Equipment (in term of adequacy to meet program)
    a. Quantity, quality, age, numbers

(Continued III)

C. Teaching Staff

  1. Number of Staff members
  2. Educational preparation & Training
  3. Teaching Experience
  4. Work experience
  5. Source of Supply

D. Anticipated Program Changes

  1. Additions Deletions

     (By Curricular Area, Course, Occupation, Job)

  2. Criterion for change
  3. Duration of Change
  4. New Offerings
     a. Objectives, skills, knowledges
     b. How determined, evaluated
     c. Criterion for success
  5. Instruction Techniques, Procedures, Activities
  6. Anticipated enrollment
  7. Facilities available for new program
     a. Location
     b. Utilization
  8. Anticipated Construction for new program
  9. Equipment available: Anticipated purchases

(Continued III-D)

10. Selection & Screening practices for entrance
11. How Financed (agency)
12. Staff requirements (Number)
    a. Preparation requirements
    b. Experience requirements

E. Anticipated Facility Changes

1. Additions and deletions by curricular-course area
2. Anticipated date of Change
3. Location of Facilities (New)
4. Utilization of facilities
    a. Classroom - Laboratory
5. Equipment & teaching materials deleted - added to existing

APPENDIX C

Community College Data Available

Appendix C

DATA GATHERED ON COMMUNITY COLLEGES FROM EXISTING STATE DEPARTMENT OF EDUCATION SOURCES

Data are gathered on vocational training and trainees in Oregon Community Colleges and are compiled and stored in the State Department of Education, Division of Community Colleges and Vocational Education. The following list of reporting forms have been identified as contributing to the aims of this project and are employed in the PIE Project to collect certain information from community colleges not gathered through the survey instrument:

Form No.	Form Title
280.11	Enrollment-Vocational Education: Preparatory and Cooperative
280.12	Enrollment-Vocational Education: Supplementary Including Apprentice
280.5	Enrollment-Under Separate Contracts
280.8	Enrollment-Unduplicated: All Classifications
280.81	Enrollment-Vocational Education: Unduplicated Enrollment by Occupational Classification

These report forms and instructions for their use are found in the Handbook for Records and Reporting for Oregon Community Colleges published by the State Department of Education.

Two additional reporting forms, Follow-up of Enrollees in Cooperative and Preparatory Vocational Education Programs and Vocational Education Instructional Plan, (VE-91), gather data from community colleges not found in the Handbook. These two reporting forms are also used to obtain similar information on Vocational education in Oregon secondary schools. Both forms are issued by the State Department of Education, Division of Community Colleges and Vocational Education, and when completed are returned to the Division for data analysis.

Three forms are used by the Division of Community Colleges and Vocational Education of the State Department of Education to accumulate data on adult vocational education programs in schools other than community colleges. These forms are as follows:

Application for approval - Adult Supplementary Course (VE-68)

Reimbursement Application for Adult Vocational Classes

Final Report and Reimbursement Data for Adult Vocational Classes

Another form from the Division of Community Colleges and Vocational Education used in the PIE Project is titled School or Training Agency Report: Manpower Development and Training and Area Redevelopment Acts (OE 4021). This form collects data from all schools, public and private, enrolling MDT trainees.

The Division of Administrative Services, Research Section, of the State Department of Education is responsible to inventory high school subjects taught and to enumerate enrollments in these subjects. An IBM printout of data gathered from Form 341.06 - Inventory of High School Subjects Taught is used for these purposes.

Characteristics of Trainees Under the MDTA and the ARA., (MT-101) is the form employed by the State Department of Employment, Division of Community Manpower Programs, to gather data on MDT trainees. Data from this exam are also employed in this PIE project.

Each ensuing page contains the following information for each form: form number, form title, origin of form, what data is to be taken from form, and use to be made of the data in the PIE project.

APPENDIX C

Data Gathered on Community Colleges From Existing State Department of Education Sources

In Appendix C are data available to the P.I.E. study from the Division of Community Colleges and Vocational Education, Oregon State Department of Education. The data are contained on various forms systematically collected by the Division of Community Colleges and Vocational Education from all community colleges in Oregon and include information related to vocational education programs for secondary school students, post high school students, adults, MDTA participants, and special supplementary students. Each ensuing page contains the following information for each form: form number, form title, origin of form, what data are to be taken from form and use to be made of data in the P.I.E. study.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
280.11 (Aug.65)	ENROLLMENT VOCATIONAL EDUCATION: PREPARATORY AND COOPERATIVE	DEPARTMENT OF EDUCATION	Legal Designation of District Reporting	To identify the name and location of the agency reporting
		Division of Community Colleges and Vocational Education Salem, Oregon	Identification of vocational Service: Preparatory and Cooperative. Course number Course Title Purpose and type of Program Secondary Preparatory Cooperative Post-Secondary Preparatory Cooperative Adult Preparatory Special Needs Total enrollment in course	To identify the total enrollment in each Service area by purpose and type of program. This data is used to identify the number of students training in a particular Service program area. To identify number and titles of course being offered in an area. The enrollment in the course identifies the number of students developing a particular skill within a Service program area.
			Clock hours in term	To determine an estimate of time it takes to complete a course and enter the labor market with skill.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
280.12 (Aug.65)	ENROLLMENT-VOCATIONAL EDUCATION: SUPPLEMENTARY (including apprentice)	Department of Education Division of Community Colleges and Vocational Education Salem, Oregon	Legal designation of district reporting.	To identify the name and location of the agency reporting.
			Identification of vocational Service: Supplementary	By the total enrollment of each Supplementary course in a Service program area, a total enrollment in all Supplementary courses (including apprentice) can be identified.
			Course number Course Title Student's Identification Code number (U.S.O.E. Code) Male Enrollment Female Enrollment Total enrollment in course.	The number and titles of Supplementary courses identify the courses being offered in an area. The enrollment in the course identifies the number of Supplementary students developing additional skills within a Service program area. The code number identifies the Supplementary student's occupation at the time he is taking the course.
			Clock hours in term	To determine an estimate of time it takes to complete a Supplementary course and enter the labor market with a new skill.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
280.5 (Aug.65)	ENROLLMENT - UNDER SEPARATE CONTRACT	Department of Education Division of Community College and Vocational Education Salem, Oregon	Legal Designation of district reporting.	To identify the name and location of the agency reporting
			Course number Course Title	To identify the courses being offered under separate contract, e.g., M.D.T.A. and Civil Defense classes.
			Total enrollment in course.	To identify the number of M.D.T.A. students and other students under separate contract. By gathering a grand total enrollment from all the courses, the number of students in courses under separate contract can be determined.
			Clock hours in term	To determine an estimate of time it takes for completing the course.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
280.8 (Aug.65)	ENROLLMENT - UNDUPLICATED: ALL CLASSIFICATIONS	DEPARTMENT OF EDUCATION Division of Community Colleges and Vocational Education Salem, Oregon	Legal Designation of District Reporting	To identify the name and location of the agency reporting
			Total of unduplicated enrollees for year Part-time Full-time	To identify the number of vocational students attending the institution. This data can be compared to the maximum number of vocational students a school can handle to determine the adequacy of the facilities to accommodate this number of enrollees. Full-time and Part-time students are identified to determine those taking a full-time load of vocational courses.
			Resident Students Non-Resident Students in-state Non-Resident Students out-of-state	To identify those vocational enrollees who are being served that come from Oregon. Non-Resident Out-of-State Students indicate students from outside of Oregon
			High School Students	The total number of vocational students who are in Post-Secondary or adult classifications are identified by subtracting the number of high school students from the total unduplicated count.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
280.81 (Aug.65)	ENROLLMENT - VOCATIONAL EDUCATION: UNDUPLICATED ENROLLMENT BY OCCUPATIONAL CLASSIFICATION	DEPARTMENT OF EDUCATION: Division of Community Colleges and Vocational Education Salem, Oregon	Legal Designation of District Reporting	To identify the name and location of the agency reporting.
			Identification of Vocational Service Program area.	To identify the enrollment by occupational classification for each Service program area, i.e. a total enrollment for that Service can be gathered to identify the number of enrollees in that area.
			D.O.T. or S.I.C. code classification	To identify the occupational classification of enrollees.
			Occupational Classification Total Enrollment	Total enrollment by occupational classification is used to identify the total number of trainees pursuing training toward a particular occupation.
			Enrollment by Purpose Below 9th grade Secondary Grade 9 Grade 10 Grade 11 Grade 12 Post-Secondary Grade 13 Grade 14	To identify the number of enrollees at each educational level

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
No Form number	FOLLOW-UP OF ENROLLEES IN COOPERATIVE AND PREPARATORY VOCATIONAL EDUCATION PROGRAMS	DEPARTMENT OF EDUCATION Division of Community Colleges and Vocational Education Salem, Oregon	Legal Designation of District Reporting	To identify the name and location of the agency reporting
			Identification of vocational Service Program area. D.O.T. or S.I.C. code Classification Occupational Classification Total number completed Program Requirements	To identify the total number completing program requirements, a total can be gathered to indicate trained individuals in a particular Service program area and those trained with the skills found in a particular classified occupation.
			Left Prior to Normal Completion with Marketable Skills.	To identify the total numbers that left prior to normal completion with marketable skills.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
No form number	High School Pre-Print Form Developed From Form 341.06 - Inventory of High School Subjects Taught	State Department of Education Division of Administrative Services Research Section Salem, Oregon	Name of School	To identify the name and location of the agency reporting.
			Courses Code Number*	Course code number is used for identifying a course in data processing.
			Title of Courses Offered	To determine the titles and numbers of courses offered in the school for that school year.*
			Unduplicated enrollment for the school year in each course.	To identify the number of secondary students found in vocational education courses for the school year.
			*Courses 7310-7370 identify non-reimbursed vocational education (Practical Arts) courses. Courses 8000-8690 identify reimbursed vocational education courses.	*The courses listed on the pre-print form are determined from a report form (341.06) sent out each fall to the State high schools. The course identified on the pre-print form are those courses that were offered for the current school year.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
No form number	REIMBURSEMENT APPLICATION FOR ADULT VOCATIONAL CLASSES*	State Department of Education Division of Vocational and Post-High School Education Salem, Oregon	Name, district, number, and address of school district.	To identify the name and location of the agency reporting.
			Identification of Service program area.	To determine the Service program area that the adult Vocational Classes will apply.
			Title of Class (Course)	To identify the titles and numbers of courses to be offered.
			Starting and ending data.	To identify the amount of time it will take to complete the training.
			Anticipated Enrollment	To identify individuals who may acquire skills indicated in the application.
			Tuition Per Person	To identify the tuition expense assessed a student to take a particular adult Vocational Class.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
No form number	TITLE REPORT AND REIMBURSEMENT DATA FOR ADULT VOCATIONAL CLASSES*	State Department of Education	Name, district number, and address of school district.	To identify the name and location of the agency reporting.
		Division of Vocational and Post-High School Education	Identification of Service program area.	To identify the Service program area that the list of Adult Vocational Classes apply.
			Title of Class (Course)	To identify the title and number of the courses offered.
		Salem, Oregon	Enrollment Male Female Total	To identify the enrollment in each course by male, female, and total enrollment totals an estimate for the total number gaining skills in a Service program area.

*In Schools Other Than Community Colleges

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
V.E.68 (65)	APPLICATION FOR APPROVAL: ADULT SUPPLEMENTARY COURSE*	STATE DEPARTMENT OF EDUCATION	Names of Address of Institution or School	To identify the name and location of the agency reporting
		Division of Community Colleges	Course Title Course Number if Applicable	To identify the projected course title and its code number. This is to be used to determine the projected adult vocational courses.
	*In Schools Other Than Community Colleges		Course Schedule Clock hours for: Class Laboratory Total	To identify the amount of time it takes to complete the training.
			Identification of Occupational instruction Area, i.e. Occupational Service Program area.	To identify the Service program area that the projected course applies.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
V.E. 91 (66)	VOCATIONAL EDUCATION INSTRUCTIONAL PLAN	STATE DEPARTMENT OF EDUCATION Division of Community Colleges and Vocational Education Salem, Oregon	Name and address of Educational Agency	To identify the name and location of the agency reporting
			Identification of Service program area	To identify the Service program area in which the projected program will be offered.
			Identification of the vocational education project and the group being served.	To identify whether the projected program is an extension and improvement of an existing program or is a new project. To identify whether the projected program is to serve secondary, post-secondary, adult, or other individuals.
			Length of Instructional program	To determine an estimate of time it takes for completing the projected program.
			Identification of whether or not program will be a continuing program.	To determine if the program will continue after the first year.
			Estimated enrollment	To determine an estimate of the projected number of enrollees who will be obtaining new occupational skills.
			Occupation(s) or occupational group(s) for which training is to be given.	To identify the occupational area that the training skills will apply

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
OE 4021 (Rev. 5-64)	SCHOOL OR TRAINING AGENCY PROJECT REPORT	STATE DEPARTMENT OF EDUCATION	Name and Address of School/Training Agency (Public or Non-Public)	To identify the name and location of the agency reporting, and whether the school is a public or non-public institution.
	Manpower Development and training & Area Redevelopment Acts	Division of Community Colleges and Vocational Education	Type of School/ Training agency	To identify in what type of institution, i.e. high school, community college, private vocational school, or other, an M.D.T. Trainee is enrolled.
		Manpower Development: Supervisor: Kirby Brumfield	Project identification Project Number Occupational Title D.O.T. Code	1. To identify the project number: The first digit indicates the year of the program, the 2nd, 3rd, and 4th digits identify the location of the course, and the last three digits identify the assigned code numbers for the course.
				2. To identify the occupational Title of the course being offered and the D.O.T. code of the course.
			Number of Clock Hours	To identify the length of the training course.

Form No.	Title of Form	Origin of Form	Data Taken From Form	How Data is Used in P.I.E. Study
D/L D-HEW MT 101 (Rev. 7-64)	CHARACTERISTICS OF TRAINEES Under the M.D.T.A. and the A.R.A.*	STATE DEPARTMENT OF EMPLOYMENT	Local Employment Office Number	To identify the location where the referred individual is registered.
		Division of Community Manpower Programs	Project Number	To identify the type of activity the individual is being referred. The project number will indicate whether the referred trainee will be trained in an institution or on the job*. The project number also identifies the location of training and the course number of the training course being given.
	*Every referred MDTA trainee completes this form.		Referred to training or service	To identify whether or not the individual was accepted or refused by the referred committee.
			Enrolled	To identify whether or not the referred individual once accepted by the referred committee is enrolled in the training program.

*For all M.D.T. trainees enrolled in an institution see Form No. OE 4021 to identify the name and type of school, the course title by occupational classification, the length of the course, and the enrollment in the course, for all M.D.T. trainees in On-The-Job Training contact the local employment office for information.

APPENDIX D

Analysis of University of Oregon Data Gathering Instruments

Appendix D

RESULTS OF AN ANALYSIS OF UNIVERSITY OF OREGON DATA GATHERING INSTRUMENTS

High School Student Survey

Expand instrument to include students in post high school vocational education training.

Develop more items to assess information needed on educational background and attainment level of the student; i.e., amount and type of vocational training; approximate grade earned in subject areas of mathematics, English, industrial arts, commercial and vocational education courses.

Items dealing with work experience and occupational aspirations need clarification and subdividing.

Develop item to determine length of residence in state and local area.

Determine student estimates of abilities to advance in job.

Student estimates of capabilities should be identified in terms of near future job changes.

Dropout Survey

Rewrite items to simplify language level.

Determine level of achievement by subject areas during school.

Determine type of elective courses taken in school.

Determine what school preparation dropouts feel contributed most to their work preparation.

Determine length of residence in state and local area.

Determine dropout estimates of abilities to advance in job.

Determine estimates of ability to meet future job changes.

Employee Survey

Simplify and subdivide section on extra educational training.

Determine reasons for early withdrawal from school if applicable, and its relative effect on job satisfaction.

Determine employment-unemployment history.

Revise vocational job training information to eliminate questionable alternatives.

Determine length of state and local residence and the number of moves in state within past 10 years.

Identify more precisely the preferred area of residence and work.

Revise job satisfaction section to remove redundancies.

Obtain estimates of abilities to meet emerging job changes.

Determine interest and willingness to undergo new job training.

Employer's Survey

Determine number of type of jobs available according to training requirements.

Determine number of employees needed by specific job.

Revise entrance requirement section for more comprehensive coverage.

Estimate number of workers entering and leaving jobs.

Estimate number of job shifts.

Estimate number of newly emerging jobs and worker requirements to handle the job demands.

High School Staff

Modify for vocational administration only.

Revise and expand in terms of existing vocational education programs.

Estimate what proportion of students are enrolled in vocational education program.

Estimate anticipated changes to vocational education program

Estimate adequacy of facilities to meet future vocational enrollments.

APPENDIX E

Guide to Administering Data Instruments

Data Instruments

Appendix E

A GUIDE TO ADMINISTERING THE DATA COLLECTION INSTRUMENTS

In an effort to provide for efficient and effective utilization of the data collection instruments, the following material is set forth as a manual of administration procedures for use by field personnel. This manual is intended to provide broad guidelines from which more detailed instructions can be developed subsequent to the initiation of phase two of the total planning, implementation, evaluation project.

Letter of Endorsement

The nature of the PIE project, the magnitude of the undertaking as a research effort, the potential for a significant breakthrough in the field of education and vocational education in particular, and the success of the pilot study demand a high degree of coordinated effort and cooperation from many agencies and individuals in Oregon. In order that the objectives of the project be fulfilled and success of the pilot effort be enhanced, it is recommended that a letter supporting the project and requesting the full cooperation of all individuals and agencies concerned be drafted for endorsement. The following are a suggested listing of endorsees.

1. Governor of Oregon
2. Commissioner of Labor
3. Commissioner of Employment
4. Oregon School Boards Association
5. Association of Community College Presidents
6. Oregon Association of School Administrators (Supts.)
7. Oregon Association of Secondary School Principals
8. Oregon Association of IED Superintendents (County Supts.)
9. Private High Schools Association
10. Oregon Association of Private Vocational Schools
11. Directors of State and Federal Bureaus of Apprenticeship and Training
12. State Department of Education - Superintendent and Assistants in Departments
13. Chancellor of the State System of Higher Education
14. Oregon Association of High School Personnel and Guidance Counselors
15. Directors of various agencies responsible for licensing proprietary schools
16. Educational Coordinating Council
17. State Boards of Education and Higher Education
18. Chamber of Commerce for Survey Area

GENERAL PROCEDURES

Preliminary Preparations

The degree to which any system for administering questionnaires and data collection instruments is functional depends upon the amount of detailed preparation undertaken before the task is begun. The following items are suggested as preliminary steps to the survey of any or all population groups in the study.

1. Advance preparation of materials should be completed

    A. A sufficient number of instruments should be prepared well in advance for each of the population groups to be surveyed.

    B. Extra copies of each instrument should be printed to allow for contingencies, such as changes in sample size.

    C. Materials should be counted and packaged for distribution.

    D. Provisions should be made for distribution of packets to individual agencies and institutions where the instruments are to be administered.

    E. Procedures or instructions for handling packets of materials before and after completion should be supplied to all cooperating institutions.

2. Notification about the study.

    A. Agencies and instituions participating in the survey should be made aware of the nature and purpose of the study, the purpose of the questionnaire, the date and time of administration of the instruments, and what is expected of them as participants.

    B. Respondents participating in the survey should similarly be made aware of the items in A. above

    C. A letter containing information of A. should be sent to all institutions and agencies to be involved in the survey prior to the initiation of phase two of the PIE study which has the endorsement of appropriate high state officials; e.g. the Governor, Superintendent of Public Instruction, Head of Department of Employment, etc.

3. Room and facilities for administration

The room and/or facilities in which the questionnaires are to be administered should be located in a relatively quiet area of the building where freedom from noise and distraction will permit the respondent greater concentration on selecting his responses. Tables, tablet arm chairs, or a similar writing surface should be available for each respondent as well as the necessary supplies of pencils, erasers, etc.

4. Group size

Whenever possible, questionnaires should be administered to groups of 25 to 35 respondents per proctor. This is particularly true of the student population. Small groups will enable the proctor to supervise the administration more closely, lessen the opportunity for interaction among respondents and increase the validity of the individual responses to the instruments. While the room should present a relaxed environment, a testing atmosphere should prevail during the administration of the instruments.

5. Distribution of materials to the respondents

The distribution of materials is an important step in the administration of any questionnaire. Some preparations may be made in advance by the proctor to minimize the distribution problems. Counting, sorting, and stacking instruments prior to the time the respondents appear will greatly expedite the distribution of materials. Some of these tasks are often delegated to assistant, thereby freeing the proctor to command the immediate attention of the group and begin the orientation.

6. The orientation

The orientation should establish the mood for the survey. It should serve to motivate respondents to feel that their answers will provide a service both to themselves and others. If properly motivated they will more likely exercise care in selecting the appropriate answers. Establishing a proper environment will assist in producing maximum results from the questionnaire. It is important, therefore, that respondents understand why they are being asked to complete the questionnaire and how the results will

6. The orientation (Cont.)

affect them. Respondents must be assured their answers will be treated in a confidential manner. Responses will be viewed only by members of the project staff.

7. Instructions for completing the instrument

Instructions for completing the instruments are given on the title page of each questionnaire. These instructions should be reviewed with each group in order that equivalent situations will be developed between similar groups, thereby increasing the reliability of the survey.

Examples given on the title page of each instrument should be reviewed by the proctor with each group of respondents. Particular emphasis should be given to the need for clear and concise statements where written responses to questions are requested.

8. Questions by respondents

Respondents may have questions regarding specific items in the questionnaire or the instructions for completing the instrument. Proctors should not attempt to change the attitude of the person responding. Rather, they should endeavor to interpret the item as objectively as possible so as to refrain from biasing the respondee in his answer. Incorrect and biased answers by proctors can often be avoided through careful study of the questionnaire prior to the time of administration. In this manner, problem questions and answers may be anticipated by the proctor.

9. Time limitations

Though the average time necessary to complete each questionnaire is approximately 20 minutes, strict time allotments or schedules for administration should be discouraged. Both student and adult groups will contain individuals of varying rates of reading ability and comprehension. It is important that these persons be given the opportunity to complete the questiomaire at their own rate of speed.

10. Completed questionnaire

The respondee should be instructed on what to do with the completed questionnaire; i.e., whether to return it to the proctor or deposit it at a central location.

11. Absentees

Provisions should be made to administer the questionnaires to persons absent on the day the first survey is taken. Administrators of the participating agencies and institutions should be consulted and arrangements made to handle this problem.

12. Return of completed questionnaires

Procedures should be set forth for returning the completed instruments to the central distribution points.

13. Data processing

If electronic methods of processing the data are to be applied in the pilot test phase, computer programs must be located or written for tabulating the questionnaires. Code sheets must be developed for all items in the questionnaire and especially those items which request a written statement response.

Specific Procedures: Individual Instruments

High School Student Questionnaire

A letter of introduction to the study bearing the endorsement of appropriate educational agencies should be sent to the superintendent, board chairman, and each high school principal of the district participating in phase two of the project. A request for permission to survey 12th grade students of the district should be included in the letter to the superintendent and principals. Time should be allotted for the superintendent to meet with the school board and/or high school principals regarding this request, if he deems it necessary. Since school board meeting dates vary considerably among districts, sending the letter at least six weeks in advance of administration date should provide sufficient notice for this purpose.

When permission has been obtained to administer the questionnaire to 12th grade students, a formal request should be made to the high school principal for a meeting to establish procedures for conducting the survey. At this meeting final arrangements should be made for conducting the survey and time schedules for meeting student groups should be established. Special consideration should be given to minimizing the amount of lost time for classes by students and interruption of the school routine during the survey. A follow-up letter reiterating the arrangments for administration of the questionnaire should be sent to the high school principal subsequent to this meeting.

If teachers of modern problems classes or other members of the instructional staff are to be used as proctors, arrangements should be made with the principal for time and place to conduct an inservice training of these teachers in the procedures for administering the questionnaires. Since it is most likely that this training will take place after school hours, it is recommended that particular attention be given to holding impositions upon teacher time to a minimum. Many of the instructions regarding administration procedures could be written in outline form thereby reducing time spent in review with the teachers.

Where members of the school staff are to be used as proctors, materials and instructions for their handling should be provided sufficiently in advance to permit them to make the necessary preparations for the survey.

The general procedures outlined in preceding paragraphs should be developed in written form to provide the proctor with an outline of procedural steps to follow.

Students absent of the day the survey is taken should be given the questionnaire on their return to school. If members of the instructional staff of the school are used as proctors, perhaps one teacher or the school counselor could administer the questionnaire to the absentees. Where proctors from outside the school district are used to administer the questionnaire, members of the school counseling staff might perform this function for them. When the predetermined deadline for absentees has been reached, the number of students who have not completed the questionnaire should be noted and the percentage of return from the total number of 12th grade students computed.

Community College Student Survey

Administration of the Student Survey in the community colleges of the pilot test area, presents a unique problem. Since students from all levels and types of programs are to be included in the survey, a system of administration must be developed which will insure against possible multiple involvement of students in classes meeting at widely varied times.

The following is a suggested procedure: Administer questionnaires on an individual class basis. The first class, which appears on each student registration card, is arbitrarily selected as the time for giving the questionnaire to that particular student. An identification card is prepared bearing the name of the student and the class instructor and clipped to the corner of each instrument. Groups are then sorted in accordance with the period of the day, and the name of each teacher. The process of developing teacher-student locator cards will be greatly facilitated where automated processes of handling student record information are available.

Students are instructed to remove identification tags from questionnaires as they are distributed to assure students of confidential treatment of the respondees' answers. Students absent on the day the questionnaire is administered, may be identified through the questionnaires remaining with the teacher and the identification card attached to the instrument. Absentees may be given the questionnaire by the individual teacher or a member of the counseling staff upon their return to school. Persons who fail to complete the questionnaire within a predetermined time limit may be identified through return questionnaires, and a per cent of the total student body participating in the survey determined.

A procedure similar to that used to contact school district superintendents, board chairmen, and high school principals, should be used with the President, and the Deans of Instruction and Vocational Education of the community college. A letter stating the nature and purpose of the PIE study, bearing the endorsement of relevant educational agencies should be mailed to the community college President, the Deans of Instruction and Vocational Education and the chairman of the Board of Directors. This letter would contain a request to survey all students of the community college. Time should be allotted for a meeting with the Board of Directors, by any of the three community college administrators regarding this request if it is deemed necessary. Since Board meeting dates vary considerably among community college districts, sending the letter at least six weeks in advance should provide sufficient notice of this purpose.

When permission has been obtained from the institution to administer the questionnaires to the students, a meeting should then be scheduled with the Dean of Instruction for the purpose of making final arrangements for the survey.

If community college personnel are to serve as proctors for the administration of the questionnaires, inservice training programs should be conducted to develop a uniform administration technique among all proctors, and equivalent situations among student groups participating. Written procedural instructions should be given to the proctors which will provide them with a progressive deliniation of study to be followed. A meeting to review this material and to discuss the administrative procedures will thus minimize the amount of time required for staff participation.

Dropout Survey

It is recommended that competent, trained interviewers be selected to administer the dropout questionnaire. Where trained interviewers are not available, inservice training programs should be conducted to prepare capable persons to assume this role.

The dropout instrument may be administered in one of two ways. In the first method, the dropout reports to a designated location, receives his questionnaire, is provided an opportunity to answer the questions, and then is interviewed concerning his responses. In the second method, the questionnaire is completed by the interviewer in a discussion meeting with the dropout at an appointed time.

The first approach appears to be the most expedient method in that the interviewer would be principally involved in checking the responses of the dropout to assure completion of the instrument, and averting possible misinterpretations of the questions. In this approach, the questionnaire could also be mailed to the dropout prior to the time he reports to the central office for his interview.

Employee Questionnaire

Arrangements must be made with each employer for a suitable time and place to administer the employee questionnaire. While impositions on the time of both the employee and the employer should be held to a minimum, the employee should have ample time to complete the questionnaire in an unhurried manner. Perhaps extended coffee breaks or lunch hours could be shared by the employee and the employer to provide adequate time for administering the instrument.

A letter indicating the nature and purpose of the PIE study should be sent to employers selected for participation in the survey. This letter should bear the endorsement of appropriate industrial and government agencies and should urge the cooperation of all employees in the project. A request for permission to administer the survey to employees of the firm should also be contained in this letter.

When permission has been obtained to administer the questionnaire to employees, a meeting should be scheduled with the employer to discuss the time and place for the survey.

Competent, trained examiners should administer the questionnaire to small groups of 25-30 employees per proctor. Efforts should be made to attain a 100% sample of the employees selected in the firm. This may require a follow-up of absentees on the day in which the initial survey was taken.

Since the employer survey is planned to be administered to the unemployed worker, it is recommended that arrangements be made with each of the agencies to which unemployed workers report concerning employment opportunities or compensation to administer the employee survey on an individual interview basis. An approach similar to that recommended in the procedures for administering the dropout questionnaire could also be utilized for the unemployed worker. That is, the employee instrument may be administered in the following way. The unemployed worker reports to a designated location, receives his questionnaire, is provided an opportunity to answer the questions, and then is interviewed concerning his responses. Qualified personnel to serve as interviewers may be found on most staffs of State Employment and Welfare agencies.

The Employer Questionnaire

Employers of firms participating in the Employer Survey should be advised of the nature and purpose of the PIE project. A letter of endorsement by appropriate employer associations and government agencies encouraging participation and cooperation in the project should accompany a request for an interview by project staff with the employer or his representative. At this meeting, the structure of the employer questionnaire should be reviewed for the employer. An appointment should be set to meet with the firm's representative who will furnish the data. If the firm has a widely diversified employment, arrangements should be made to collect the responses to the questionnaires at a later date.

The first part of the Employer questionnaire may be administered in an interview situation. This interview could take place at the first meeting with the employer or small firms. Firms having a large number of employers may necessitate a second meeting.

Part two of the employer survey should be left for completion and collection at a later date. An opportunity should be made available to discuss the responses of the employer to this section of the survey. It is important that the respondent complete this portion of the survey in a thorough and careful manner. The employer should be given ample time to complete the questionnaire and to discuss or clarify any items in question.

Secondary School, Community College and Proprietary School Questionnaires

Administrators of educational institutions participating in the study should be notified of the nature and purpose of the PIE project. A letter of endorsement by appropriate state agency heads and officials encouraging participation and cooperation in the survey should accompany a request for an interview by a project staff member with the institution head and, in the case of secondary schools and community colleges, the director of the vocational education program. The questionnaire should be reviewed at this meeting. A schedule for the completion of the instrument should be set, and an opportunity made available for respondents to discuss and, if needed, clarify the responses to the questionnaire.

State Department of Education
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

SECONDARY SCHOOL VOCATIONAL EDUCATION PROGRAMS

Instructions for completing this questionnaire

Read each question carefully. Select the answer you feel is best. Write the number of your answer on the short line beside the question.

EXAMPLE:

5 1. In which state is the city of Portland located?

1) Washington
2) California
3) Wyoming
4) Montana
5) Oregon
6) Idaho

A few questions will ask you to write an answer. Write as clearly as possible.

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

STUDENT QUESTIONNAIRE
Secondary & Post-High School

1-8. Name of School_______________________________

Location of School_______________ _______________
City County

Where do you live?_______________ _______________
City County

_____9, Do you live

1) In a city, town, or suburb?
2) In the country but not on a farm?
3) On a farm?

_____10. How long have you lived at this address?

1) less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) more than 10 years

_____11. How long have you lived in this county?

1) less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) more than 10 years

_____12. How long have you lived in this state?

1) less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) more than 10 years

_____13. What is your age?

1) 15
2) 16
3) 17
4) 18
5) 19
6) 20
7) 21
8) over 21_______________
Write in age.

_____14. What is your sex?

1) Male
2) Female

____15. What is your marital status?

1) Single (never married)
2) Married
3) Widowed (wife or husband deceased)
4) Separated
5) Divorced

____16. What is your present level in school or training?

1) Senior in high school
2) First year of school or training beyond high school
3) Second year of school or training beyond high school
4) Third year of school or training beyond high school
5) Fourth year of school or training beyond high school
6) Adult education student (day or evening classes)

If your answer was not Adult Education, skip to question 18.

____17. If your answer to question 16 was adult education, are you taking these courses

1) to improve your job skills?
2) for your own personal enjoyment?

____18. In general, have the grades you received in school been

1) close to an "A" average?
2) close to a "B" average?
3) close to a "C" average?
4) below a "C" average?

What has been your average grade in each of the following high school subjects?

____19. English
1) Above average (A or B) 2) Average (C) 3) Below average (D or below)

____20. Math
1) Above average (A or B) 2) Average (C) 3) Below average (D or below)

____21. Science
1) Above average (A or B) 2) Average (C) 3) Below average (D or below)

____22. Social Studies (History, Geography, Government)
1) Above average (A or B) 2) Average (C) 3) Below average (D or below)

____23. What was your major course emphasis in high school?

1) College preparatory
2) Technical-Vocational
3) General Education

(If you have not taken any vocational courses in high school, skip to question 39.)

What kind of grades did you receive in the high school vocational subjects listed in questions 24 to 34? Answer only those subjects you have taken with one of the following:

1) above average (A or B)
2) average (C)
3) below average (D or F)

____24. Agriculture

____25. Auto Shop Mechanics

____26. Building Construction (Carpentry)

____27. Drafting and Design

____28. Electronics and Electricity

____29. Sheet Metal Shop or Machine Shop

____30. Business or Secretarial

____31. Commercial Food Preparation and Service (Restaurant or other)

____32. Commercial Sewing (Seamstress)

____33. Distributive Education and/or Marketing

____34. Nursing (Indigent or Child Care)

____35. If you checked any of the items 24 - 34, was the class combined with work experience on the job?

1) Yes. If yes, identify what the work experience was.

36-38. ____
(Write in)

2) No.

___39. Do you feel the education and training you received (or are receiving) in high school has prepared (or will prepare) you for employment in your future line of work?

1) Yes, very well
2) Yes, moderately well
3) Yes, but very little
4) No, not at all

___40. How do you plan to prepare for your occupation? (Indicate State only if other than Oregon) (Select only one answer)

1) Four years at a college or university.

____
(Name of college or university, if known) State

2) Two years or less at a community college then transfer to a four-year school.

____
(Name of community college, if known) State

3) Two years or less at a community college then find a job.

____
(Name of community college, if known) State

41-44. 4) At least two years at a technical institute (such as O.T.I.).

____
(Name of technical institute, if known) State

5) Trade or specialty school.
(Example: Electronic, Mechanics, Business, Barber, Beauty.)

____
(Name of school, if known) State

6) Military Service.

____
(Branch of service, if known)

7) Learn while working (apprenticeship, correspondence, night school).

____
(Type of Training, if known)

8) Finish high school and get a job.

____
(Name of employer or firm, if known) State

9) Other: (Write in)______________________________

____45. How long have you worked for pay (other than home chores)?

1) just last summer
2) last summer and part-time during the past school year
3) two school years or more
4) have never worked for pay

____46. If you are now working for pay (other than home chores), is this job

1) full-time (35 or more hours per week)
2) part-time (34 or less hours per week)
3) I am not working.

47-49. If you are now working, describe briefly what you do in your job. If you are not working, skip to question 57.

____
(Write in)

____50. In terms of your present thinking, what job or occupation do you plan to follow as your life's work?

51-53. 1) (Write in specific job name)__________________________________
2) Don't know. If you don't know, skip to question 57 and continue.

____54. How certain are you of your choice of occupation in the last question?

1) very certain
2) moderately certain
3) not too certain

____55. As new job opportunities become available, would you be willing to change your present choice of occupation?

1) yes, would change
2) no, would not change
3) don't know

____56. In view of your interests and what you feel you are capable of doing, do you think you will be able to advance to higher positions in the type of work you indicated in question 50?

1) Yes.
2) No.
3) Don't know.

____57. Do you think the line of work you intend to follow will provide you with steady year-round employment?

1) Yes.
2) No.
3) Don't know.

____58. Do you think changes will occur during the next 3 to 5 years in the line of work you plan to follow which will require more training than that which is presently required?

1) Yes.
2) No.
3) Don't know.

____59. Within the next ten years, do you think automation will either greatly change or eliminate the line of work you intend to follow?

1) Yes.

2) No.
3) Don't know.

____60. Would you be willing to take training for new job skills if you were told you could then get a good job?

(1) Yes
(2) No. If no, skip to question 62.

____61. How long a program of training would you be willing to take if you thought you could then get a good job?

1) 3 months or less
2) 4 to 6 months
3) 7 to 9 months
4) 10 to 12 months
5) 1 to 2 years
6) more than 2 years

____62. In terms of your present feelings, what maximum amount of time would you be willing to spend in getting to work?

1) less than 15 minutes
2) 15 to 30 minutes
3) 30 to 45 minutes
4) 45 to 60 minutes
5) 1 - 1½ hours
6) More than 1½ hours

In terms of your future job, how important to you are each of the statements in questions 63 - 71? Use one of the following responses to answer each question.

1) very important	3) not important
2) of some importance	4) do not know
	5) have not thought about it

____63. Steady employment (no winter or summer lay-offs)

____64. Liking the work you do (work you enjoy doing)

____65. Earning a large salary

____66. Regular work hours (example: 8:00 - 5:00 daily 5 days per week)

____67. Opportunity for job advancement (chance for promotion)

____68. Making your own decision, not having to rely on others, being your own boss.

____ 69. Working with things (materials & equipment) rather than people

____70. Working with other persons who feel about their job and work as you do

____71. Good working conditions

____72. When you have completed your education, if you cannot find the type of job you want in the area that you want to live, would you

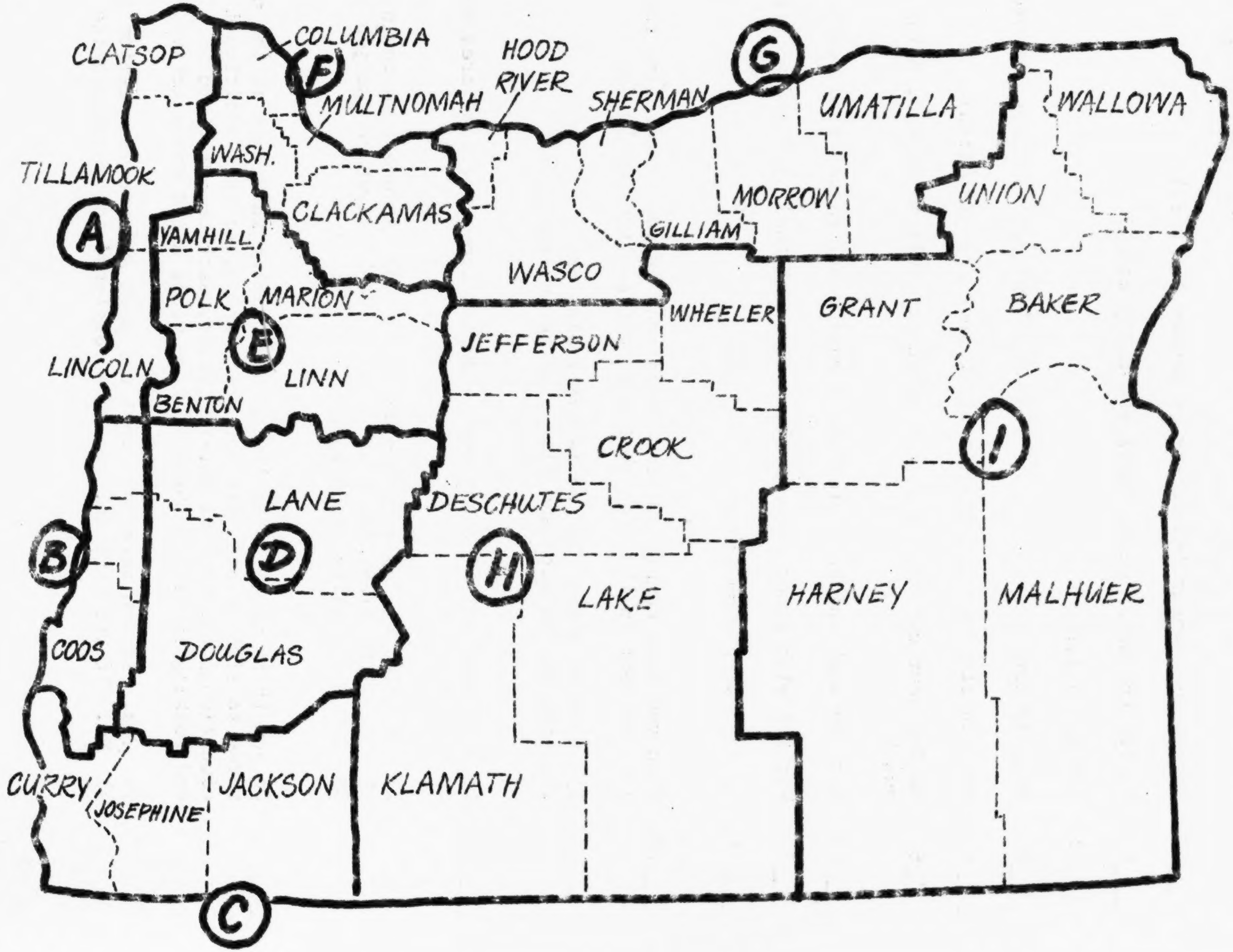
1) move to where the job is available, or
2) stay in the area and find a different type job

____73. If you could not find any work, how far from your home area would you be willing to move to get a job?

1) 50 miles or less, in Oregon	4) anywhere in the northwest
2) 50 - 100 miles, in Oregon	5) anywhere the job is available
3) 100 - 200 miles, in Oregon	

____74. Do you think you will be living and working in Oregon in the next three to five years? (If you are planning to take additional educational training or enter military service, will you be living and working in Oregon three to five years after these activities?)

1) Yes. If you mark yes, turn the page and answer question 75
2) No. If you mark no, you have completed the questionnaire


CLATSOP
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F
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SHERMAN
UMATILLA
WALLOWA
WASH.
TILLAMOOK
CLACKAMAS
MORROW
UNION
A
YAMHILL
GILLIAM
WASCO
POLK
MARION
WHEELER
GRANT
BAKER
JEFFERSON
E
LINN
LINCOLN
BENTON
CROOK
I
LANE
DESCHUTES
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D
H
LAKE
HARNEY
MALHUER
COOS
DOUGLAS
CURRY
JOSEPHINE
JACKSON
KLAMATH
C

75. The map on the opposite page shows the location of every county in Oregon. Below is a list of all the counties and their major cities.

From this list, circle the one county in which you think you will be working and living in the next three to five years. (Select an answer even if you are not positive.)

Example: If you think you will be working and living in Multnomah County in the next three to five years, you would circle your answer as follows:

F. (1) Columbia (St. Helens)
(2) Washington (Hillsboro)
[✓ (3) Multnomah (Portland)]
(4) Clackamas (Oregon City)

Remember, circle only one answer.

A. (1) Clatsop (Astoria)
(2) Tillamook (Tillamook)
(3) Lincoln (Newport)

B. (1) Coast part of Lane (Florence)
(2) Coast part of Douglas (Roseburg)
(3) Coos (Coos Bay)

C. (1) Curry (Gold Beach)
(2) Josephine (Grants Pass)
(3) Jackson (Medford)

D. (1) Lane (Eugene)
(2) Douglas (Roseburg)

E. (1) Marion (Salem)
(2) Yamhill (McMinnville)
(3) Polk (Dallas)
(4) Benton (Corvallis)
(5) Linn (Albany)

F. (1) Columbia (St. Helens)
(2) Washington (Hillsboro)
(3) Multnomah (Portland)
(4) Clackamas (Oregon City)

G. (1) Hood River (Hood River)
(2) Wasco (The Dalles)
(3) Sherman (Moro)
(4) Gilliam (Arlington)
(5) Morrow (Heppner)
(6) Umatilla (Pendleton)

H. (1) Jefferson (Madras)
(2) Wheeler (Mitchel)
(3) Deschutes (Bend)
(4) Crook (Prineville)
(5) Klamath (Klamath Falls)
(6) Lake (Lakeview)

I. (1) Wallowa (Enterprise)
(2) Union (La Grande)
(3) Grant (John Day)
(4) Baker (Baker)
(5) Harney (Burns)
(6) Malheur (Ontario)

State Department of Education
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

DROPOUT

Instructions for completing this questionnaire

Read each question carefully. Select the answer you feel is best. Write the number of your answer on the short line beside the question.

EXAMPLE:

5 1. In which state is the city of Portland located?

1) Washington	4) Montana
2) California	5) Oregon
3) Wyoming	6) Idaho

A few questions will ask you to write an answer. Write as clearly as possible.

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

DROPOUT QUESTIONNAIRE

____
Name

1-6. What is your present address?

____
P.O. Box number or street   City   State

_____7. Do you live

(1) In a city, town or suburb?
(2) In the country but not on a farm?
(3) On a farm?

_____8. Approximately how long have you lived at your present address?

(1) Less than 6 months
(2) 6 months to 1 year
(3) 1 to 3 years
(4) 4 to 6 years
(5) 7 to 10 years
(6) More than 10 years

_____9. How long have you lived in this county?

(1) Less than 6 months
(2) 6 months to 1 year
(3) 1 to 3 years
(4) 4 to 6 years
(5) 7 to 10 years
(6) More than 10 years

_____10. How long have you lived in this state?

(1) Less than 6 months
(2) 6 months to 1 year
(3) 1 to 3 years
(4) 4 to 6 years
(5) 7 to 10 years
(6) More than 10 years

_____11. What is your age?

(1) Less than 16
(2) 16
(3) 17
(4) 18
(5) 19 or over

_____12. What is your marital status?

(1) Single (never married)
(2) Married
(3) Widowed (wife or husband deceased)
(4) Separated
(5) Divorced

_____13. What is your sex?

(1) Male
(2) Female

____14. What is the highest grade in school you have completed?

(1) 1 - 4
(2) 5 - 8
(3) 9
(4) 10
(5) 11

____15. How long have you been out of school?

(1) 3 months or less
(2) 4 to 6 months
(3) 7 to 9 months
(4) 10 to 12 months
(5) 13 to 15 months
(6) 14 to 18 months
(7) More than 18 months

____16. Since leaving school, how long have you been working full time?

(1) 3 months or less
(2) 4 to 6 months
(3) 7 to 9 months
(4) 10 to 12 months
(5) 13 to 15 months
(6) 16 to 18 months
(7) More than 18 months
(8) Have worked only part time
(9) Have not worked

____17. How many full-time jobs have you held since leaving school?

(1) none
(2) 1
(3) 2
(4) 3
(5) 4
(6) More than 4

____18. Are you presently

(1) Employed full-time? (35 or more hours per week)
(2) Employed part-time? (Less than 35 hours per week)
(3) Unemployed

19-21. What is your present job? (Indicate your last full-time job if presently unemployed.) If you have never had a full-time job and are now unemployed, skip to question 22.

(Write in)____

Where are you presently employed? (Indicate last full-time employer if now unemployed.)

______________________________ ____________ ____________
(Company or person's name) City State

Describe briefly what you do (did) in this job.

(Write in) ____

____

____22. Approximately how long after leaving school did you get your first full-time job (more than 35 hours per week)?

(1) Less than 2 weeks
(2) About 1 month
(3) Between 1 and 3 months
(4) Between 4 and 6 months
(5) Between 7 and 9 months
(6) Between 10 and 12 months
(7) More than 1 year
(8) Have never held a full-time job

____23. Have you held more than one job since leaving school?

(1) Yes
(2) No. If no, skip to question 27.)

____24. (Most important) If you have held more than one job since leaving school, select from the following list the three most important reasons why you changed jobs. (Place the numbers of your answers on the lines beside 24, 25 and 26 in the order of importance.)

____25. (Second)

____26. (Third)

(1) Got a better job with more pay
(2) Moved to another area
(3) Illness (personal or family)
(4) Company lay off
(5) Job ran out
(6) Did not like working conditions
(7) Did not like the boss
(8) Fired
(9) No chance for promotion

27-29. What line of work do you intend to follow in the next five years? (If you have not decided, write "don't know.")

____
(Job Title or Type of Work)

____30. As new jobs develop, would you be willing to change your present choice of what line of work you intend to follow?

1) Yes, would change
2) No, would not change
3) Don't know.

____31. Do you think you will be able to advance to higher positions and better pay in the line of work you intend to follow?

(1) Yes
(2) No
(3) Don't know

____32. In the line of work you intend to follow, do you think that advancing to a better position would require that you have more training?

(1) Yes
(2) No
(3) Don't know

____33. Within the next ten years, do you think automation will either greatly change or do away with the line of work you intend to follow?

(1) Yes.

(2) No
(3) Don't know

____34. Would you be willing to take training for new job skills if you were told you could then get a good job?

(1) Yes
(2) No. If no, skip to question 36.)

____35. How long a program of training would you be willing to take if you thought you could then get a good job?

(1) 3 months or less
(2) 4 to 6 months
(3) 7 to 9 months
(4) 10 to 12 months
(5) 1 to 2 years
(6) More than 2 years

What kind of grades did you receive as a student in the subjects listed in questions 36 to 45? Answer only those subjects you have taken with one of the following:

(1) Above average (A or B)
(2) Average (C)
(3) Below average (D or F)

____36. English

____37. Math

____38. Science

____39. Social Studies (Geography, History, Government)

____40. Wood shop

____41. Mechanical drawing

____42. Homemaking

____43. Music

____44. Art

____45. P.E.

What kind of grades did you receive in the vocational subjects listed in questions 46 to 56? Answer only those subjects you have taken with one of the following:

(1) Above average (A or B)
(2) Average (C)
(3) Below average (D or F)

____46. Agriculture

____47. Auto Shop Mechanics

____48. Building Construction (Carpentry)

____49. Drafting and Design

____50. Electronics and Electricity

____51. Sheet Metal Shop or Machine Shop

____52. Business or Secretarial

____53. Commercial Food Preparation and Service (Restaurant or other)

____54. Commercial Sewing (Seamstress)

____55. Distributive Education and/or Marketing

____56. Nursing (Child or Indigent Care)

____57. Do you feel your high school courses prepared you for the type of work you want to follow?

(1) Yes
(2) No. If no, skip to question 59.

____58. How well did your high school courses prepare you for the type of work you want to follow?

(1) very well
(2) somewhat
(3) just a little
(4) not at all

Below, on the left, are listed different types of vocational training programs. If you have had any vocational training since leaving school, write in what it was on the line next to the type program you took and indicate whether you completed the training program. If you have not had any vocational training since leaving school, skip to question 71.

Program	On the correct line, write in the name of the job for which you were trained.	Did you complete program? (1) Yes (2) No. (3) Now enrolled.
1. Vocational-Technical program in a community or junior college. (Example: drafting, electronics, engineering, auto mechanics, carpentry, medical technician)	____________________ 59.	____________ 60.
2. Private vocational school. (Example: trade school, business college, barber or beauty school)	____________________ 61.	____________ 62.
3. Apprenticeship program	____________________ 63.	____________ 64.
4. Training during military service (Example: heavy equipment operations, diesel mechanics, electronics)	____________________ 65.	____________ 66.
5. Company operated training program with four or more weeks of instruction	____________________ 67.	____________ 68.
6. If other than above, write in	____________________ 69.	____________ 70.

Why did you drop out of school? From the following list select the most important and the second most important reasons.

____71. Most important

____72. Second most important

(1) Would not have had enough credits to graduate
(2) Expelled or suspended for too many absences or getting into trouble in school and never went back
(3) What I was learning in school would not help me in the kind of work I wanted to do.
(4) Most of my friends had already left school
(5) Had to work and help support family
(6) Wanted to get a job and earn my own money
(7) Married and/or pregnant
(8) Did not get along with most of my teachers
(9) Other (Write in)________________________________

____73. Have others in your family (brothers, sisters) also dropped out of school before graduation?

(1) Yes
(2) No
(3) Have no brothers or sisters

____74. Did your family

(1) Encourage you to stay in school?
(2) Encourage you to leave school?
(3) Leave the decision to drop school up to you?

____75. Who did you talk to about deciding to drop out of school?

(1) Parents
(2) Friends your own age
(3) Relatives
(4) Other adults
(5) Teachers, counselors, administrators
(6) Other. (Write in)__________________________
(7) No one

____76. Do you feel your decision to drop out of school will hurt your chances of getting good jobs in the future?

(1) Yes
(2) No
(3) Don't know

How important to you are the items about a job in questions 77 to 85? Use one of the following responses to answer each question:

(1) Very important
(2) Of some importance
(3) Not important
(4) Don't know
(5) Have not thought about it

____77. Steady employment (no winter or summer lay-offs)

____78. Liking the work you do (work you enjoy doing)

____79. Earning a large salary

____80. Regular work hours (Example: 8:00-5:00 daily 5 days per week)

____81. Opportunity for job advancement (chance for promotion)

____82. Making your own decisions, not having to rely on others, being your own boss

____83. Working with things (materials and equipment) rather than people.

____84. Working with other persons who feel the same about their job and work as you do

____85. Good working conditions

____86. Whether you are now working or not, what is the longest amount of time you would want to spend traveling from where you live to your job?

(1) 15 minutes or less
(2) 15 - 30 minutes
(3) 30 - 45 minutes
(4) 45 - 60 minutes
(5) 1 - 1½ hours
(6) more than 1½ hours

____87. If you could not find the type of job you wanted around your home area, which would you be willing to do?

(1) Move around until you found the kind of job you wanted,
(2) Stay at home and take any job you could get, or
(3) Not work (If you mark this answer, skip to question 89.)

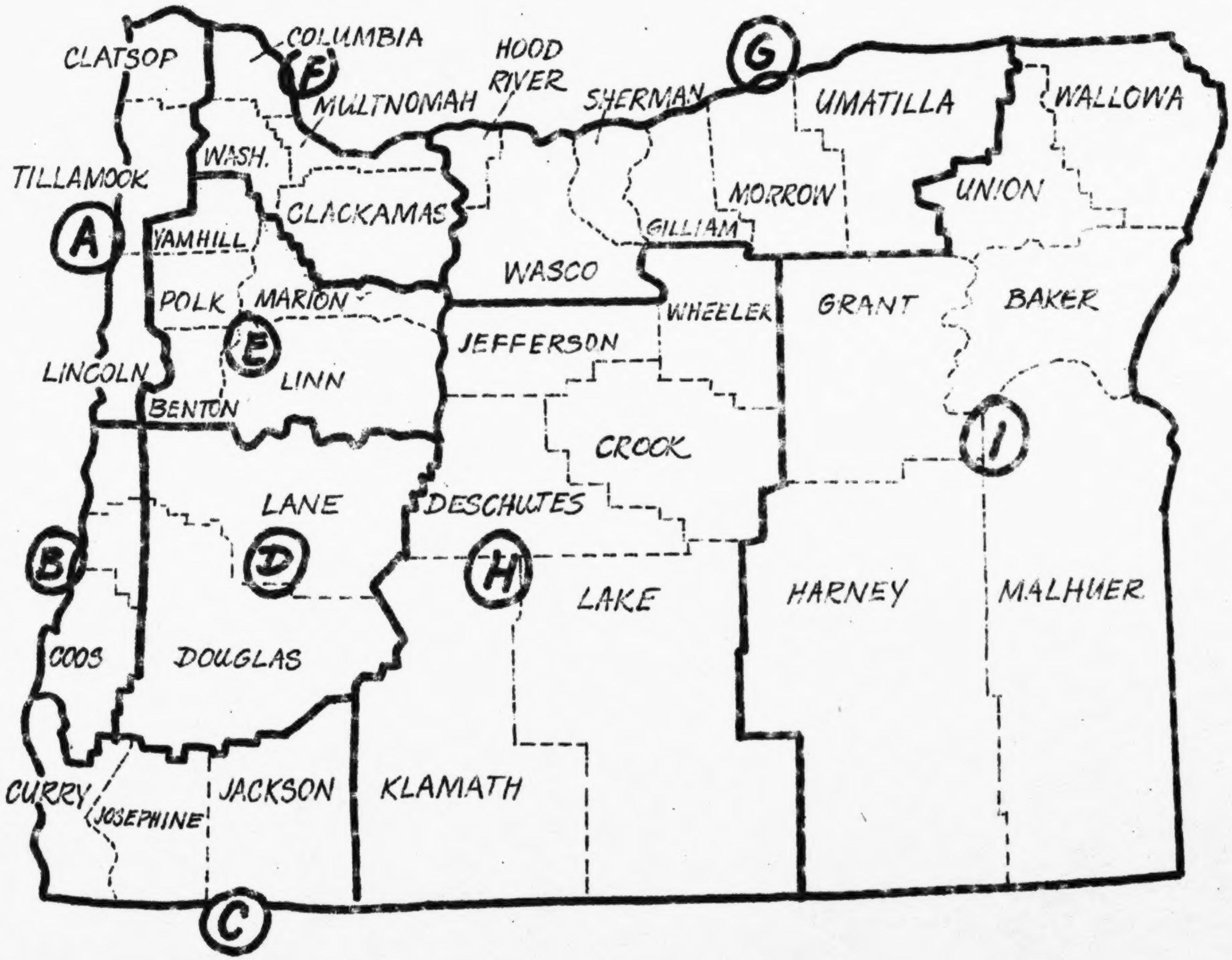
____88. If you could not find any work, how far away from your home area would you be willing to move to get a job

(1) 50 miles or less, in Oregon
(2) 50 - 100 miles, in Oregon
(3) 100 - 200 miles, in Oregon
(4) Anywhere in the northwest
(5) Anywhere

____89, Do you think you will be living and working in Oregon in the next three to five years?

(1) Yes. If you mark yes, turn the page and answer question 90.
(2) No. If you mark no, you have completed the questionnaire.

90. The map below names every county in Oregon. Circle the name of the county in which you think you will be working and living in the next three to five years. (Select an answer even if you are not positive.) Circle only one name.


CLATSOP
COLUMBIA
F
HOOD RIVER
G
SHERMAN
MULTNOMAH
UMATILLA
WALLOWA
WASH.
TILLAMOOK
CLACKAMAS
MORROW
UNION
A
YAMHILL
GILLIAM
WASCO
POLK
MARION
WHEELER
GRANT
BAKER
E
JEFFERSON
LINCOLN
LINN
BENTON
CROOK
I
LANE
DESCHUTES
B
D
H
LAKE
HARNEY
MALHUER
COOS
DOUGLAS
CURRY
JOSEPHINE
JACKSON
KLAMATH
C

State Department of Education
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

EMPLOYEE

Instructions for completing this questionnaire

Read each question carefully. Select the answer you feel is best. Write the number of your answer on the short line beside the question.

EXAMPLE:

5 1. In which state is the city of Portland located?

1) Washington
2) California
3) Wyoming
4) Montana
5) Oregon
6) Idaho

A few questions will ask you to write an answer. Write as clearly as possible.

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

P.I.E. Project
Employee Survey

1-6. Where do you live?

____________________ ____________________ ____________________
City County State

_____7. Do you live

1) In a city, town or suburb?
2) In the country but not on a farm?
3) On a farm?

_____8. How long have you lived at your present address?

1) Less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) More than 10 years

_____9. How long have you lived in this county?

1) Less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) More than 10 years

_____10. How long have you lived in this state?

1) Less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) More than 10 years

11-16. What is your birth date?

__________/__________/__________
month / day / year

17-25. What is your Social Security Account Number?

__________/__________/__________

_____26. What is your sex?

1) Female
2) Male

____27. What is your marital status?

1) Single (Never married)
2) Married
3) Widowed (Wife or husband dead)
4) Separated
5) Divorced

____28. Are you presently

1) Employed full-time? (35 or more hours per week)
2) Employed as an apprentice?
3) Employed part-time? (less than 35 hours per week)
4) Unemployed?

29-31. What is your present job?
(Indicate last full-time job if presently unemployed)

____
(Write in job title)

Describe briefly what you do in this job.
(Describe last full-time job if presently unemployed)

____
(Write in)

32-35. Who is your present employer? (Indicate last full-time employer if now unemployed)

____________________	____________	____________
Employer or Company name	City	State

____36. How long have you been employed by your present employer?

(If now unemployed, select an answer which tells how long you were with your last employer.)

1) Less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) More than 10 years

____37. Do you have your training and work record on file with any employment agency? (Examples: Oregon Employment Service, Labor or Craft Union, School Placement Service).

1) Yes

2) No

____38. How did you obtain your present full-time job? (Use last full-time job if now unemployed)

1) Public Employment Agency (such as Oregon Employment Service)
2) Private Employment Agency (such as Northwest Placement Service)
3) An Employee Organization (such as Trade or Craft Union)
4) Response to a "want-ad"
5) School or training institution placement service
6) Told by a friend and applied
7) Filed an application with several firms employing people in my line of work
8) Other than above ____________________
(Write in)

____39. Do you have any other paying job in addition to your present full-time job?

1) Yes
2) No
3) Presently unemployed

If your answer to question 39 was No, or Unemployed, skip to question 44 and continue.

40-42. (Write in) ____________________
(Second job title)

Describe briefly what you do in your second job.

____

____43. What is the average number of hours you work per week in your second job?

1) 1 - 3 hours
2) 4 - 6 hours
3) 7 - 9 hours
4) 10 - 12 hours
5) 13 - 15 hours
6) 16 - 18 hours
7) 19 - 21 hours
8) 22 - 24 hours
9) 25 or more hours

____44. Since leaving school, what is the approximate total time you have been working?

1) Less than 6 months
2) 6 months to 1 year
3) 1 to 3 years
4) 4 to 6 years
5) 7 to 10 years
6) 11 to 15 years
7) 16 to 20 years
8) 21 to 25 years
9) More than 25 years

____45. How many different employers (companies or firms) have you worked for since your first full-time job? (Consider only the past 10 years if you have worked longer than this.)

1) 1 only
2) 2
3) 3
4) 4
5) 5 - 7
6) 8 - 10
7) 11 or more

____46. If you lost your job and could not find the type work you wanted in the area that you wanted to live, would you

1) be willing to move to where the job is available, or
2) stay in the area and find a different type job?

____47. If you were willing to move to where a job you wanted was available, how far would you be willing to move?

1) 50 miles or less, in Oregon
2) 50 - 100 miles, in Oregon
3) 100 - 200 miles, in Oregon
4) anywhere in the northwest
5) anywhere

____48. Since leaving school, what is the approximate total time you have been unemployed?

1) Never unemployed
2) 0 to 3 months
3) 4 to 6 months
4) 6 months to 1 year
5) 1 to 2 years
6) 3 or more years

____49. How many times have you completely changed your line of work since your first full-time job after leaving school? (Example: welder to carpenter)

1) Never changed (skip to question 53)
2) Once
3) Twice
4) 3 times
5) 4 times
6) 5 or more times

____50. If you have completely changed your line of work more than once since leaving school, check the most important reason for changing.

Changed line of work because

1) Pay not high enough in other line of work
2) Working conditions not good enough in other line of work
3) Not enough jobs in other line of work
4) No room for advancement in other line of work
5) Other____
(Write in)

____51. If you have changed your line of work more than once since leaving school, did you have any difficulty adjusting to the new line of work?

1) Yes
2) No (Skip to question 53)

____52. If your response to question 28 was yes, which of the following best indicates the type of problem you had adjusting to a new job? (select only one answer).

1) Learning new ways of doing things
2) Adjusting to new supervisors
3) Adjusting to new company rules and policies
4) Getting acquainted with other employees
5) Learning to handle different tools and equipment
6) Other
(Write in)________________________________

____53. How do you feel about your present job with this company?

1) Like it very much
2) It's an average job
3) Don't like it
4) I am presently unemployed (if you check this answer, skip to question 58)

____54. How would you rate your present job in comparison to the same job in another company?

My present job is

1) Better
2) About the same
3) Worse

____55. (first) From the following list select in their order of importance the three things you feel are most important in making a job attractive to you.

____56. (second)

____57. (third)

1) Good working conditions
2) Good tools and/or equipment
3) Good supervisors
4) Steady employment
5) A challenging job
6) Good salary
7) Possibility of advancement
8) Other________________________________
(Write in)

____58. Are you interested in advancing to a higher position within your line of work?

1) Yes____
(Specify higher position in which you are interested)

2) No. (If your answer is No, skip to question 64).

____59. Would advancing to this higher position require that you have additional training?

1) Yes
2) No
3) Don't know

____60. Does this higher type of position or job exist where you now work?

1) Yes
2) No
3) Presently unemployed

If your answer to question 60 was No or unemployed, skip to question 63.

If your answer to question 60 was yes,

____61. Are you eligible for such a higher position where you now work if a vacancy should occur?

1) Yes
2) No
3) Don't know

____62. Does your employer provide a training program for this higher position?

1) Yes
2) No
3) Don't know

____63. Could you afford to undertake training for a higher position at your own expense?

1) Yes
2) No
3) Don't know how much it would cost.

____64. Are you presently enrolled in a training program? (Example: community college, correspondence course, trade school, on the job training program, apprenticeship program, MDTA program, Title V Program).

1) Yes
2) No (Skip to question 70)

____65. Indicate from the following list the type training program in which you are enrolled

1) Community college - day or night
2) Trade school - day or night
3) Correspondence course
4) Apprenticeship program
5) MDTA program
6) Title V program
7) Program offered by my employer or cooperating employee
8) Other____
(Write in)
9) Not enrolled in any training program

____66. Is the purpose of the training program in which you are enrolled to

1) increase your skills for your present occupational field?
2) increase your skills for a different occupational field?
3) increase your skills for promotion possibilities?
4) increase your skills for personal pleasure only?
5) Other____
(Write in)

67-69. If you answered item 2) in question 66, what is the new occupational field for which you are preparing?

____
(Write in)

____70. Would you be interested in taking an aptitude test that could help you find out what are your strongest natural abilities for training and employment?

1) Yes
2) No (Skip to question 72).

____71. This type of aptitude test takes about 2 hours, is free, and is given at many locations during the week--days or evenings--and Saturdays. Indicate which of the following times would be best for you to take the test.

1) Week days between 8 a.m. and 5 p.m.
2) Evenings between 7 p.m. and 10 p.m.
3) Saturday between 8 a.m. and noon

____72. What is the highest grade in school you have completed?

1) Didn't complete 8th grade
2) Completed 8th grade
3) Completed 9th grade
4) Completed 10th grade
5) Completed 11th grade
6) Completed 12th grade
7) Completed 13th grade
8) Completed 14th grade
9) Completed more than 14th grade

What kind of grades did you earn as a student in elementary and high school in each of the following subjects?

____73. English

1) Above average (A or B)
2) Average (C)
3) Below average (D or F)

____74. Math

1) Above average (A or B)
2) Average (C)
3) Below average (D or F)

____75. Social Studies (History, Geography, Government)

1) Above average (A or B)
2) Average (C)
3) Below average (D or F)

____76. Science

1) Above average (A or B)
2) Average (C)
3) Below average (D or F)

____77. Which of the following subjects do you think has been most helpful to you in preparation for your present job?

1) English
2) Math
3) Social Studies (History, Geography, Government)
4) Science
5) Generally, all of them
6) None of them

The questions on this page concern the type of vocational (job) training you have had. If you have never had any vocational training, skip to question 114. If you have had vocational training, answer the questions below by writing the correct numbers on the lines across from the type of training program in which you were enrolled.

Program	Complete training? 1) Yes 2) No	Training in Oregon 1) All 2) Part 3) None	How long since completing training? 1) 1 yr or less 2) 2-3 yrs 3) 4-5 yrs 4) 6 yrs & more	Training related to your job? 1) Very related 2) Somewhat 3) Not related
Vocational program in high school (Example: agriculture, business education, mechanics, commercial cooking, etc.)	____78.	____79.	____80.	____81.
Vocational and/or technical program in a community or junior college	____82.	____83.	____84.	____85.
Private vocational school (Example: trade school, business, barber or beauty school)	____86.	____87.	____88.	____89.
Apprenticeship program	____90.	____91.	____92.	____93.
Company operated training program, four or more weeks instruction	____94.	____95.	____96.	____97.
Training in military service (Example: heavy equipment operator, electronics, communication)	____98.	____99.	____100.	____101.
Other than above (Write in below)	____102.	____103.	____104.	____105.

____106. How would you rate your performance as a student in the vocational training program you answered on the previous page?

1) Above average
2) Average
3) Below average

107-109. For what job or occupation was the training you identified on the previous page?

____
(Write in)

____110. Following your training, how did the tools and equipment used in your first full-time job compare with those used in the vocational program?

1) almost the same
2) part the same
3) very different
4) didn't apply to my job
5) can't remember

____111. If you answered question 83 "part the same" or "very different," how long did it take you to learn to properly use the job tools and equipment

1) a few days
2) a few weeks
3) three to six months
4) longer than six months

____112. Following your training, how did the knowledge and skills required in your first full-time job compare with that taught in the vocational program?

1) almost the same
2) part the same
3) very different
4) didn't apply to my job
5) can't remember

____113. If you answered question 85 "part the same" or "very different," how long did it take you to learn the required knowledge and skills used in the job.

1) a few days
2) a few weeks
3) three to six months
4) longer than six months

____114. Do you think changes will occur in your present job or the job in which you are qualified to work, during the next 3 to 5 years which will require that you have additional training?

1) Yes.

2) No
3) Don't know.

____115. If such changes should occur in your job, would you prefer to

1) Take the additional training required for the job?
2) Find a job in another line of work?

____116. Do you anticipate retiring before age 65?

1) Yes
2) No

____117. Do you intend to work after retiring?

1) Yes, full-time.
2) Yes, part-time.
3) No. (Skip to question 121)

118-120. If your answer to question 117 was yes, indicate the type of work you would like to do.

____
(Write in specific job)

____121. What is the average time it takes you to get to work?

1) 15 minutes or less
2) 15-30 minutes
4) 45-60 minutes
5) More than 60 minutes

____122. What is the maximum amount of time you would be willing to spend getting to work?

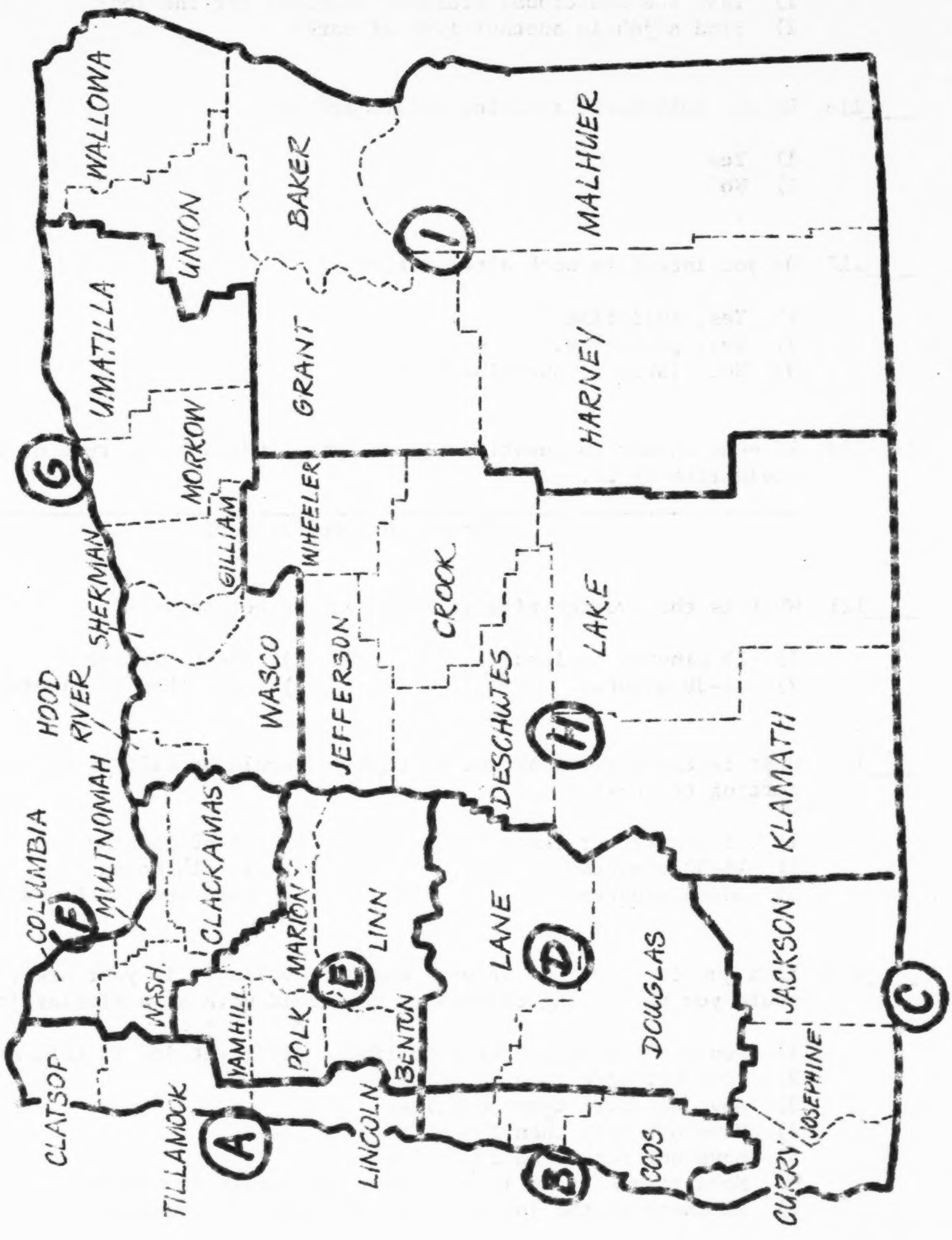
1) 15 minutes or less
2) 15-30 minutes
3) 30-45 minutes
4) 45-60 minutes
5) 1 - 1½ hours
6) More than 1½ hours

____123. If a job in your line of work was not available in your area, how far would you be willing to move so you could work at a similar job?

1) Would not move. Prefer to find a different job in this area.
2) Move not more than 25 miles.
3) Move not more than 50 miles.
4) Move not more than 100 miles.
5) Move not more than 150 miles.
6) Move across state if necessary but remain in Oregon
7) Go wherever the job was; out of state if necessary.

____124. Do you think you will be living and working in Oregon in the next three to five years?

1) Yes. If you mark yes, turn the page and answer question 125.
2) No. If you mark no, you have completed the questionnaire.


CLATSOP
TILLAMOOK
A
COLUMBIA
F
WASH
YAMHILL
POLK
LINCOLN
BENTON
MULTNOMAH
CLACKAMAS
MARION
E
LINN
HOOD RIVER
WASCO
SHERMAN
GILLIAM
WHEELER
JEFFERSON
MORROW
G
UMATILLA
UNION
WALLOWA
BAKER
GRANT
CROOK
DESCHUTES
H
LAKE
HARNEY
MALHUER
I
LANE
D
DOUGLAS
COOS
B
CURRY
JOSEPHINE
JACKSON
C
KLAMATH

125. The map on the opposite page shows the location of every county in Oregon. Below is a list of all the counties and their major cities.

From this list, circle the one county in which you think you will be working and living in the next three to five years. (Select an answer even if you are not positive.)

Example: If you think you will be working and living in Multnomah County in the next three to five years, you would circle your answer as follows:

F. (1) Columbia (St. Helens)
(2) Washington (Hillsboro)
[✓ (3) Multnomah (Portland)]
(4) Clackamas (Oregon City)

Remember, circle only one answer.

A. (1) Clatsop (Astoria)
(2) Tillamook (Tillamook)
(3) Lincoln (Newport)

B. (1) Coast part of Lane (Florence)
(2) Coast part of Douglas (Roseburg)
(3) Coos (Coos Bay)

C. (1) Curry (Gold Beach)
(2) Josephine (Grants Pass)
(3) Jackson (Medford)

D. (1) Lane (Eugene)
(2) Douglas (Roseburg)

E. (1) Marion (Salem)
(2) Yamhill (McMinnville)
(3) Polk (Dallas)
(4) Benton (Corvallis)
(5) Linn (Albany)

F. (1) Columbia (St. Helens)
(2) Washington (Hillsboro)
(3) Multnomah (Portland)
(4) Clackamas (Oregon City)

G. (1) Hood River (Hood River)
(2) Wasco (The Dalles)
(3) Sherman (Moro)
(4) Gilliam (Arlington)
(5) Morrow (Heppner)
(6) Umatilla (Pendleton)

H. (1) Jefferson (Madras)
(2) Wheeler (Mitchel)
(3) Deschutes (Bend)
(4) Crook (Prineville)
(5) Klamath (Klamath Falls)
(6) Lake (Lakeview)

I. (1) Wallowa (Enterprise)
(2) Union (La Grande)
(3) Grant (John Day)
(4) Baker (Baker)
(5) Harney (Burns)
(6) Malheur (Ontario)

State Department of Education
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

EMPLOYER

Instructions for completing this questionnaire

Read each question carefully. Select the answer you feel is best. Write the number of your answer on the short line beside the question.

EXAMPLE:

5 1. In which state is the city of Portland located?

1) Washington	4) Montana
2) California	5) Oregon
3) Wyoming	6) Idaho

A few questions will ask you to write an answer. Write as clearly as possible.

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

EMPLOYER QUESTIONNAIRE

1-5. Firm Name____________________

Firm Address____________________

Principle Product or Service____________________

Name of person completing form____________________

Title of person completing form____________________

_____6. Approximately how many of your employees have completed vocational-technical training programs in Oregon?

(1) Write in number _______
(2) None
(3) Don't know

_____7. From your knowledge of workers who have completed vocational-technical training programs (public and/or private) in Oregon, how satisfactorily do you feel these programs develop the skills and knowledges required for jobs in your firm?

(1) Very satisfactorily
(2) Satisfactorily
(3) Unsatisfactorily
(4) Do not have sufficient knowledge about training programs to judge

8. If you feel that Oregon's vocational-technical training programs have any major weaknesses in preparing students with job skills and knowledge, please briefly describe these weaknesses.

____

____

____

____

_____9. Are most of your recent job entrants from

(1) Oregon?
(2) States other than Oregon?
(3) Don't know

____10. Where do you obtain most of your employees?

(1) Oregon Employment Service	(4) Private employment agencies
(2) Trade or Craft Unions	(5) "Walk-in" and/or those responding to want ads
(3) School placement agencies	(6) Other________________ (Specify)

____11. How are job vacancies filled in your firm?

(1) By outside hiring exclusively for all positions.
(2) By outside hiring for entrant positions only; all other positions are filled by internal promotion.
(3) By both outside hiring and internal promotion for all positions.
(4) Other (write in)________________________________

____

____12. Are the promotional practices of your firm set forth in written policy?

(1) Yes
(2) No

Identify whether or not your firm uses the items listed in numbers 13 through 22 to screen applicants and select employees.

____13. Work experience
(1) Yes (2) No

____14. Training experience
(1) Yes (2) No

____15. Ability test results
(1) Yes (2) No

____16. Individual interest test results
(1) Yes (2) No

____17. Interview
(1) Yes (2) No

____18. Recommendations (school or previous employer)
(1) Yes (2) No

____19. Possessing a high school diploma
(1) Yes (2) No

____20. School and/or training grades
(1) Yes (2) No

____21. Trial performance on the job (1 day, week, etc.)
(1) Yes (2) No

22. Other (write in)____________ ______________________

____23. Does your firm find it difficult to obtain qualified personnel?

(1) Yes
(2) No (skip to question 28)

Is the difficulty in obtaining qualified applicants due to

____24. Applicants who lack proper training?

(1) Yes
(2) No

____25. Applicants with insufficient work experience?

(1) Yes
(2) No

____26. Low wage scale and/or adverse working conditions in some jobs in your firm?

(1) Yes
(2) No

____27. Reasons other than these?

(1) Yes (write in reasons)____
(2) No

____28. Do you anticipate expanding the number of jobs in your firm in the next 3 to 5 years?

(1) Yes
(2) No (skip to question 34)

Approximately how many new jobs do you expect to add?

29-30. in 1968? Number______________

31-32. in 1969? Number______________

33-34. in 1970? Number______________

35-36. in 1971? Number______________

37-38. in 1972? Number______________

____39. Do you expect jobs in your firm to be changed (either modified or replaced) during the next 3 to 5 years because of new materials, methods of processing, and/or automation?

(1) Yes
(2) No

____40. If you anticipate that job changes will occur in your firm during the next 3 to 5 years, will these changes

(1) Require minimal retraining of present employees?
(2) Require considerable retraining of employees?
(3) Require hiring new workers appropriately trained?
(4) Require both (1) and (2)?
(5) Require both (2) and (3)?
(6) Require some combination of (1), (2), and (3)?
(7) Don't know what training will be required.
(8) Do not anticipate any job changes in the next 3 to 5 years.

____41. Does your firm provide any formalized training or retraining program for employees?

(1) Yes
(2) No

____42. Does your firm encourage its employees to participate in training schools or service schools offered by other companies or agencies?

(1) Yes
(2) No (skip to next page)

43. If you answered yes to question 37, please list the names of the agencies whose training programs your employees most often attend.

____

____

____

List titles of all different occupations on your payroll.	Number of Male Workers by Age Groups						Number of Female Workers by Age Groups						Entrant Employees Hired during Years			Number of Current Job Openings
	under 25	25-34	35-44	45-54	55-64	65 and over	under 25	25-34	35-44	45-54	55-64	65 and over	1964	1965	1966	

Number of in-plant trainees completing by 1970	Replacements needed by 1970	Jobs filled by promotion only Check (X)	Entrance level education and experience requirements. Use a (1) to indicate minimum qualifications accepted and a (2) for desired qualifications												
			Training Qualifications						Experience Qualifications						
			none	High School Grad.	Trade School Grad.	Business School Grad.	Apprenticeship Years	Community or Tech. Inst. yrs.	none	0-3 mos.	4-6 mos.	6 mo. - 1 yr.	1-2 yrs.	3-5 yrs.	More than 5 yrs.

State Department of Education
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

COMMUNITY COLLEGE VOCATIONAL EDUCATION PROGRAMS

Instructions for completing this questionnaire

Read each question carefully. Select the answer you feel is best. Write the number of your answer on the short line beside the question.

EXAMPLE:

_5_ 1. In which state is the city of Portland located?

1) Washington	4) Montana
2) California	5) Oregon
3) Wyoming	6) Idaho

A few questions will ask you to write an answer. Write as clearly as possible.

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

Community College Vocational
Education Survey

Date________________________

1-3. Institution Name____

Address____
Street City County

Please complete the following questions:

What are the requirements for admission into your institution's vocational education program? (Answer questions 4 to 14 with a _1_ Required or a _2_ Not Required.)

____ 4. Open admission policy (No requirements)
(1) Required (2) Not Required

____ 5. Male only
(1) Required (2) Not Required

____ 6. Female only
(1) Required (2) Not Required

____ 7. High school graduation or equivalent
(1) Required (2) Not Required

____ 8. Written entrance examination
(1) Required (2) Not Required

____ 9. Physical examination
(1) Required (2) Not Required

____10. Personal interview
(1) Required (2) Not Required

____11. Physical capabilities test
(1) Required (2) Not Required

____12. Age requirement
(1) Required (2) Not Required

____13. Interest Inventory
(1) Required (2) Not Required

____14. G.P.A. of 2.0 or higher (using 4.0 G.P.A. System)
(1) Required (2) Not Required

Other (Write in)____

____15. Do you see any changes occurring in the next 3 to 5 years in your institution's requirements for admission into vocational education programs?

(1) Yes

(2) No (If you answer No, skip to question 28)

If you answered "yes" to question 15, identify the changes by responding to question 16-27. Answer only those for which changes are expected.

____16. Open admission policy (No requirements)
(1) Added (2) Deleted

____17. Male only
(1) Added (2) Deleted

____18. Female only
(1) Added (2) Deleted

____19. High school graduation or equivalent
(1) Added (2) Deleted

____20. Graduation from the 8th grade or equivalent
(1) Added (2) Deleted

____21. Entrance examination
(1) Added (2) Deleted

____22. Physical examination
(1) Added (2) Deleted

____23. Personal Interview
(1) Added (2) Deleted

____24. Physical capability (skills)
(1) Added (2) Deleted

____25. Age requirement
(1) Added (2) Deleted

____26. Interest Inventory
(1) Added (2) Deleted

____27. G.P.A. of 2.0 or higher (Using 4.0 G.P.A. System)
(1) Added (2) Deleted

Other (Write in)______________________________

Identify all sources by which vocational education students finance their education in your institution and estimate the proportion of each source as compared with all other sources of financing.

Source	**Proportion of Expense**
____28. Student's personal funds (self-earned) **(1) Yes (2) No**	**29-30. ____%**
____31. Advances from parents or relatives **(1) Yes (2) No**	**32-33. ____%**
____34. Scholarships **(1) Yes (2) No**	**35-36. ____%**
____37. Personal loans from school funds **(1) Yes (2) No**	**38-39. ____%**
____40. NDEA or other federal loan sources **(1) Yes (2) No**	**41-42. ____%**

Identify any other sources in the following space

43. ____ 44-45. ____%

46-48. What is the total average cost per year for a vocational student's education in your institution?

$________________(Tuition and fees, books, tools and equipment, lab fees, professional fees, etc.)

Identify each educational expense below for which vocational education students are assessed in your institution, and estimate the proportion of cost for each item as compared with the total average cost given in question 48.

Expenses		Proportion
____49. Tuition & fees (1) Yes	(2) No	50-51. ____%
____52. Books (1) Yes	(2) No	53-54. ____%
____55. Tools & Equipment (1) Yes	(2) No	56-57. ____%
____58. Uniforms and other apparel (1) Yes	(2) No	59-60. ____%
____61. Laboratory fees (1) Yes	(2) No	62-63. ____%
____64. Professional fees (1) Yes	(2) No	65-66. ____%

If there are other expenses, identify them in the following space

67. ________________________________ 68-69. ____%

How many vocational teachers do you have in the day school program?

____70. Men (full time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

____71. Men (part time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

____72. Women (full time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

____73. Women (part time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

How many vocational teachers do you have in the night school program?

____74. Men (full time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

____75. Men (part time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

____76. Women (full time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

____77. Women (part time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) 21-25
6) 26-30
7) 31-35
8) More than 36; ____________ (enter number)

____78. Do you anticipate adding more vocational teachers next year?

(1) Yes How many? ____________ (enter number)

(2) No

How many vocational classroom stations do you have for:

____79. Classroom instruction only?

1) 10 or less
2) 11-15
3) 16-20
4) 21-25
5) 26-30
6) 31-35
7) 36-40
8) More than 40; ____________ (enter number)

____80. Practical work area only (lab, shop, etc.)?

1) 10 or less
2) 11-15
3) 16-20
4) 21-25
5) 26-30
6) 31-35
7) 36-40
8) More than 40; ____________ (enter number)

____81. Combination classroom instruction and practical work area?

1) 10 or less
2) 11-15
3) 16-20
4) 21-25
5) 26-30
6) 31-35
7) 36-40
8) More than 40; ____________ (enter number)

If you need to clarify use the following space:

____

____

____82. What is the estimated maximum number of non-duplicated vocational students you can handle in your institution at one time period (either day or night)?

1) Less than 50
2) 51-100
3) 101-150
4) 151-200
5) 201-250
6) 251-300
7) 301-350
8) 351-400
9) More than 400; ____________
(enter number)

What is your anticipated non-duplicated vocational student enrollment for the day program during school year

____83. 1968-69?

1) less than 50
2) 51-100
3) 101-150
4) 151-200
5) 201-250
6) 251-300
7) 301-350
8) 351-400
9) More than 400; ____________
(enter number)

____84. 1969-70?

1) less than 50
2) 51-100
3) 101-150
4) 151-200
5) 201-250
6) 251-300
7) 301-350
8) 351-400
9) More than 400; ____________
(enter number)

What is your anticipated fulltime equivalent vocational student enrollment for the night program during school year?

____85. 1968-69?

1) less than 50
2) 51-100
3) 101-150
4) 151-200
5) 201-250
6) 251-300
7) 301-350
8) 351-400
9) More than 400; ____________
(enter number)

____86. 1969-70?

1) less than 50
2) 51-100
3) 101-150
4) 151-200
5) 201-250
6) 251-300
7) 301-350
8) 351-400
9) More than 400; ____________
(enter number)

____87. Will your existing vocational training facilities be adequate to handle the vocational enrollments you expect during the next three years?

(1) Yes

(2) No

____88. If No to question 87, is there a plan for development of new facilities in the near future?

(1) Yes

(2) No

State Department of Education
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

PROPRIETARY SCHOOL VOCATIONAL EDUCATION PROGRAMS

Instructions for completing this questionnaire

Read each question carefully. Select the answer you feel is best. Write the number of your answer on the short line beside the question.

EXAMPLE:

5 1. In which state is the city of Portland located?

1) Washington	4) Montana
2) California	5) Oregon
3) Wyoming	6) Idaho

A few questions will ask you to write an answer. Write as clearly as possible.

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

Proprietary School Vocational
Education Survey

1-3. Institution Name____

Address____
Street City County

Director__________________________ Date__________________

Please complete the following questions:

What are the requirements for admission into your institution's vocational education program? (Answer questions 4 to 14 with a 1 Required or a 2 Not Required.

____ 4. Open admission policy (No requirements)
(1) Required (2) Not Required

____ 5. Male only
(1) Required (2) Not Required

____ 6. Female only
(1) Required (2) Not Required

____ 7. High school graduation or equivalent
(1) Required (2) Not Required

____ 8. Written entrance examination
(1) Required (2) Not Required

____ 9. Physical examination
(1) Required (2) Not Required

____10. Personal interview
(1) Required (2) Not Required

____11. Physical capabilities test
(1) Required (2) Not Required

____12. Age requirement
(1) Required (2) Not Required

____13. Interest Inventory
(1) Required (2) Not Required

____14. G.P.A. of 2.0 or higher (Using 4.0 G.P.A. System).
(1) Required (2) Not Required

Other (Write in) ____

____15. Do you see any changes occurring in the next 3 to 5 years in your institution's requirements for admission into vocational education programs?

(1) Yes
(2) No (If you answer "No," skip to question 28)

If you answered "yes" to question #15, identify changes in questions 16 - 27. Answer only those for which changes are expected.

____16. Open admission policy (No requirements)
(1) Added (2) Deleted

____17. Male only
(1) Added (2) Deleted

____18. Female Only
(1) Added (2) Deleted

____19. High school graduation or equivalent
(1) Added (2) Deleted

____20. Graduation from the 8th grade or equivalent
(1) Added (2) Deleted

____21. Entrance examination
(1) Added (2) Deleted

____22. Physical examination
(1) Added (2) Deleted

____23. Personal Interview
(1) Added (2) Deleted

____24. Physical capability (skills)
(1) Added (2) Deleted

____25. Age requirement
(1) Added (2) Deleted

____26. Interest Inventory
(1) Added (2) Deleted

____27. G.P.A. of 2.0 or higher (Using 4.0 G.P.A. System)
(1) Added (2) Deleted

Other (Write in)____

Identify all sources by which students finance their education in your institution, estimate the proportion of each source as compared with all other sources of financing.

Source	Proportion of Expense
____28. Student's personal funds (self-earned) (1) Yes (2) No	29-30. ____%
____31. Advances from parents or relatives (1) Yes (2) No	32-33. ____%
____34. Scholarships (1) Yes (2) No	35-36. ____%
____37. Personal loans from school funds (1) Yes (2) No	38-39. ____%
____40. NDEA or other federal loan sources (1) Yes (2) No	41-42. ____%

Identify any other sources in the following space

43-44. ______________________________ 45-46. ____%

47-50. What is the total average cost for a student's education in your institution? (Do not include living costs)

$____________________(Tuition and fees, books, tools and equipment, lab fees, professional fees, etc.)

Identify each educational expense below for which students are assessed in your institution, and estimate the proportion of cost for each item as compared with the total average cost given in question 50.

		Proportion
____51.	Tuition & fees (1) Yes (2) No	52-53. ____%
____54.	Books (1) Yes (2) No	55-56. ____%
____57.	Tools & Equipment (1) Yes (2) No	58-59. ____%
____60.	Uniforms and other apparel (1) Yes (2) No	61-62. ____%
____63.	Laboratory fees (1) Yes (2) No	64-65. ____%
____66.	Professional fees	67-68. ____%

If there are any other expenses, identify them in the following space

69-70. ______________________________ 71-72. ____%

How many vocational teachers do you have in the day school program?

____73. Men (full time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) More than 20; ____________ (enter number)

____74. Men (part time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) More than 20; ____________ (enter number)

____75. Women (full time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) More than 20; ____________ (enter number)

____76. Women (part time)

1) 1-5
2) 6-10
3) 11-15
4) 16-20
5) More than 20; ____________ (enter number)

____77. Do you anticipate adding more teachers next year?

(1) Yes How many? ____________ (enter number)

(2) No

How many classroom stations do you have for:

____78. Classroom instruction only?

1) 1-3
2) 4-6
3) 7-9
4) 10-13
5) 14-17
6) 18-20
7) More than 20; ____________ (enter number)

____79. Practical work area only (lab, shop, etc.)?

1) 1-3
2) 4-6
3) 7-9
4) 10-13
5) 14-17
6) 18-20
7) More than 20; ____________ (enter number)

____80. Combination, classroom instruction and practical work area?

1) 1-3
2) 4-6
3) 7-9
4) 10-13
5) 14-17
6) 18-20
7) More than 20; ____________ (enter number)

If you need to clarify use the following space

____

____

____

____81. Will your existing facilities be adequate to handle the enrollments you expect during the next three years?

(1) Yes
(2) No

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

Institution__________________________________

Prepared by__________________________________

Date Prepared:

Proprietary School Vocational Education Survey

Course Title	Length of Course in Clock Hours	Sex	Students Enrolled in course July 1 to June 30		Total Number of Oregon Resident Students	Total Number of Out-of-State Resident Students	Total Number Completed Curriculum Requirements	Left Prior to Normal Completion with Marketable Skills	Anticipated Enrollment in Course July 1 to June 30	
			Full time	Part Time					1968	1969
1	2	3	4	5	6	7	8	9	10	11
		M								
		F								
		M								
		F								
		M								
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State Department of Education
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

SECONDARY SCHOOL VOCATIONAL EDUCATION PROGRAMS

Instructions for completing this questionnaire

Read each question carefully. Select the answer you feel is best. Write the number of your answer on the short line beside the question.

EXAMPLE:

5 1. In which state is the city of Portland located?

1) Washington
2) California
3) Wyoming
4) Montana
5) Oregon
6) Idah

A few questions will ask you to write an answer. Write as clearly as possible.

STATE DEPARTMENT OF EDUCATION
Division of Community Colleges
and Vocational Education
Salem, Oregon 97310

Secondary School Vocational
Education Survey

1-8. Institution Name ____________________

Address ____________________
Street City County

District No. ____________________ Date ____________________

Please complete the following questions:

How many vocational education teachers do you have in the school vocational education program?

____ 9. Men (full time)

1) None
2) 1-5
3) 6-10
4) 11-15
5) More than 15; ____________ (enter number)

____10. Men (part time)

1) None
2) 1-5
3) 6-10
4) 11-15
5) More than 15; ____________ (enter number)

____11. Women (full time)

1) None
2) 1-5
3) 6-10
4) 11-15
5) More than 15; ____________ (enter number)

____12. Women (part time)

1) None
2) 1-5
3) 6-10
4) 11-15
5) More than 15: ____________ (enter number)

____13. Do you anticipate adding more vocational teachers next year?

1) Yes. How many? ____________________ (Enter Number)

2) No

How many vocational classroom stations do you have for:

____14. Classroom instruction only?

1) 1-3
2) 4-6
3) 7-10
4) More than 10; ____________
(enter number)

____15. Practical work area only (lab, shop, etc.)?

1) 1-3
2) 4-6
3) 7-10
4) More than 10; ____________
(enter number)

____16. Combination, classroom instruction and practical work area?

1) 1-3
2) 4-6
3) 7-10
4) More than 10; ____________
(enter number)

If you need to clarify, use the following space____________________________

____

____

____17. How many students in your institution are currently enrolled in at least one vocational education course?

1) 50 or less
2) 51-100
3) 101-150
4) 151-200
5) 201-250
6) 251-300
7) 301-350
8) 351-400
9) More than 400____________
(enter number)

____18. What proportion of the number of students identified in question 17 are following a vocational emphasis as their high school major?

1) 0-15 per cent
2) 16-30 per cent
3) 31-45 per cent
4) 46-60 per cent
5) 61-75 per cent
6) 76-90 per cent
7) 91-100 per cent

____19. What proportion of the number of students identified in question 17 do you estimate will not go on to college but will seek a job after leaving high school?

1) 0-15 per cent
2) 16-30 per cent
3) 31-45 per cent
4) 46-60 per cent
5) 61-75 per cent
6) 76-90 per cent
7) 71-100 per cent

20-22. What is the maximum number of students enrolled in vocational courses in your institution that you can handle during any one semester?

____

What is the anticipated non-duplicated enrollment in vocational courses for the following school years?

____23. 1968-69

1) Less than 25
2) 26-50
3) 51-75
4) 76-100
5) 100-150
6) 151-200
7) More than 200; ______________ (enter number)

____24. 1969-70

1) less than 25
2) 26-50
3) 51-75
4) 76-100
5) 100-150
6) 151-200
7) More than 200; ______________ (enter number)

____25. Will your existing vocational education facilities be adequate to handle the vocational enrollments you expect during the next three years?

1) Yes

2) No

____26. If "no" to question 25, is there a plan for development of new vocational education facilities in the near future?

1) Yes

2) No

APPENDIX F

Supplement to Instrument Utilization

Appendix F

SUPPLEMENT TO UTILIZATION OF INSTRUMENTS

The following material is intended as supplementary information to using the data collection instruments in phase two of the study. Many potential problem areas in instrument utilization are identified and discussed. Where it is possible, relationships between the PIE project concerns and other institution and agency efforts of generating and gathering data are discussed and recommendations made.

The instruments developed in phase one for gathering data on human resources, occupational opportunities and vocational education program planning. Through this system, input data about human resources and job opportunities are related to existing and needed vocational education training programs. A central data bank serves as a coordinating and storage unit to be used by regional training institutions in planning needed vocational education programs. A pilot study will be conducted as phase two of the project to test the efficiency of the feedback model for planning, implementing and evaluating vocational education programs. Criterion for determining the efficiency of the feedback model have been defined by the Research Coordinating Unit for Vocational Education at Oregon State University. The pilot study will be limited to a specific time interval, approximating six months in duration.

The Portland School District has been selected as a possible site for piloting the system. Some of the factors which contributed to the selection of this site for the pilot program are:

(1) Size.
The Portland School District is located in a metropolitan area of a size that is significant as a part of the total population of Oregon

(2) The diversity in economy and work force represented in the Portland area is sufficient to be representative of the state.

(3) A wide range of educational opportunities are available.

(4) There is easy access to a multiplicity of private and public resource agencies.

Since field tests of the instruments to this point in the project have been principally individual and small group feedback situations, it is recommended that each of the data instruments be administered to larger intact segments of the study populations to further establish instrument reliability, validity, and ease of use. The sample population for these tests should be representative of the population universe and constitute intact systems, i.e., total school system, total business firms, etc., such that the complete administrative cycle of instrument use can be simulated and tested.

These field tests should be made in a model pilot test situation. The community or geographic area selected should contain a large high school, a community college, and small, medium, and large sized industries. It is recommended that this sample include: (1) a senior class of 300 or more students, (2) at least one industry of 50 or more employees in jobs requiring pre-employment training exclusive of the professional and managerial occupations, (3) a minimum of one industry of 10 to 50 employees in the occupations described in Number 2 above, (4) two or three industries of one to nine employees, (5) a community college offering vocational, college transfer and adult education courses, (6) two proprietary schools, and (7) a randomly selected group of at least 100 unemployed workers who report regularly to an employment or unemployment agency.

Particular attention should be given during the field test to the ease with which the sample population follows instructions for completing the instrument, the ease with which they are able to read and comprehend the questions statements and the length of time necessary for administering the instruments to each of the sample groups and contingencies that arise in the administration cycle in each intact system. Problems which the respondent encounters while completing the instrument may necessitate minor revision and alteration of the questionnaire prior to initiation of the pilot test.

Student Questionnaire

This instrument is designed to gather information from students in three population groups: (1) public and private schools, (2) community colleges, (3) any vocational or proprietary schools offering employment training.

High School Students

The student questionnaire is to be administered to all 12th grade students of public and private high shools. Senior class students were selected over other high school students because of their greater maturity. In addition, most students at this grade level have made specific plans for work or continued education after graduation. Thus, it was assumed that the responses of this age group about projected post-high school plans would be more realistic and reliable than the plans of students in earlier high school grades. As the total feedback model for gathering human resource data is refined, students from lower grade levels should then be surveyed.

Trained personnel should be used to administer the questionnaires. All proctors must be familiar with the instrument and the administration procedures to be followed. If trained personnel cannot be hired, counseling personnel from individual schools or a team of counselors or other instructional staff from several schools might be used.

Teachers of Modern Problems classes usually meet all senior students every day and could also be used as proctors. This approach may provide the least complicated system for administering the questionnaire. If either of these two courses are pursued, steps must be taken to familiarize the proctors with the instrument, the purpose of the study, and the manner in which individual biases and prejudices often times reflected in proctor responses to student questions may affect the validity of the data. Inservice training in these areas will insure greater uniformity in administration conditions, procedures and techniques.

Every reasonable effort should be made to obtain a 100% sample of the 12th grade students. Though the percentage of senior class students absent on any given day is relatively small, it is assumed that the greatest share of absentees will be students who are more prone to miss school because of poor academic achievement or low learning incentives. If an equitable representation of all student types is to be maintained in the study, it is particularly important that a follow-up of absentees be made to insure that they have an opportunity to complete the questionnaire.

Through the investigation of secondary sources of information on the student questionnaire, it was learned that the High School-College Relations Council[1] annually determines the anticipated post-high school plans of all Oregon high school seniors through a statewide survey. A sample of the instrument used by the Council is included as Supplement A of this section (see p. 206). The upper right quadrant of this questionnaire contains items of special study interest to the Council. These items change with each year. A follow-up is made each fall after graduation on a ten per cent random sample of each senior class in the state to determine how students actually fulfilled their stated expectations. All information is compiled by the College Relations Council and reported annually.

Many items of the High School-College Relations regular survey form parallel the PIE instrument. These are principally concerned with student identification, and individual post-high school educational plans. However, it would not be possible to include the remainder of the PIE survey items in the special interest section without considerable expansion of the present instrument.

---

[1] High School-College Relations Council, Oregon State System of Higher Education, University of Oregon, Eugene, Oregon. Richard Pizzo, Executive Secretary.

If the pilot study is initiated in the fall of the year, a survey of high school seniors might be jointly undertaken by the High School-College Relations Council and the PIE project. A decision to do so would have to be reached prior to the time the items to be studied by the College Relations Council are determined if sections of the PIE student questionnaire were to be included as the special interest section for the 1968-69 school year.

Three other alternatives are also possible in a cooperative survey: (1) the high school relations survey form could be expanded to include all of the items for PIE student questionnaire, (2) the PIE student questionnaire could be appended to the high school-college relations survey form, or (3) portions of the college relations form could be included as part of the PIE questionnaire. Administration of the combined instruments could be accomplished by either personnel of the high school-college relations staff, the PIE staff, or a team of proctors composed of members of both staffs. By coordinating this activity, both agencies would avoid considerable duplication of effort, and reduce student contact and class interuptions. The cost of printing the instruments and collecting and processing the data could also be shared by both agencies, thereby decreasing operational expenditures. It is assumed that this would be the most efficient and effective method of gathering the data on high school students.

Proprietary School

Proprietary schools are service oriented schools which are privately owned and managed. A substantial number of Oregon youth and adults receive post-high school vocational education through these institutions. In most fields of vocational education, their endeavors to remain flexible have permitted them to adapt rapidly to the current and changing needs of business and industry in training persons for specific jobs.

More than 55% of the proprietary schools operating in Oregon are licensed by the State Department of Education under the provisions of ORS Chapter 345. This law specifies that schools of this nature must be licensed and supply a $2,500.00 performance bond to the State of Oregon. The law also provides that private vocational schools outside the state which solicit business within the state must register with the State Department of Education. All licensed proprietary schools are required to submit (1) a copy of their course offerings and the tuition charged, (2) a list of the school's instructors, and (3) a statement as to the training and experience of each instructor. The remaining forty-five per cent of the proprietary schools in Oregon are licensed by separate boards (see, Supplement B, p. 207) such as the State Board of Aeronautics, the Oregon Board of Barber Examiners, and the State Board of Cosmetic Therapy. More than half the proprietary schools in Oregon (51.7%) are situated in Portland.

Most proprietary schools offer courses that a student may complete in a specified period of time varying from a minimum of one week to a maximum period of fourteen months. The average time length of courses offered is slightly more than six months. As such, the number of students completing courses during any one year will far exceed the number of enrolled students at any given time. In determining the total student capacity of private vocational schools for any year, it is necessary to take into account the length of the training period required for enrollees to complete a specific course.

An estimate made by the Oregon Association of Private Vocational Schools (OAPS)[2] in the spring of 1965 stated that those private vocational schools licensed under provisions of ORS Chapter 345 have an enrollment capacity of 10,000. In view of the fact that the average length of programs in the proprietary schools is slightly more than six months, it is conceivable that in the course of a full year, these proprietary schools could serve 20,000 students.

Since schools may be licensed at any time throughout the year, the enrollments and similar data reported by each institution do not cover the same time periods. This information has limited uses in assessing the total group of proprietary schools. A system of annual reporting by proprietary schools on a specific date, covering a stated period of time, and providing more detailed information on vocational program offerings and student enrollments is needed before this information can become useful data. A system of this type could be maintained by the Oregon Association of Private Vocational Schools for use by proprietary schools or other educational and noneducational agencies.

Since the information desired from proprietary schools was not readily available through secondary sources, questionnaires were developed for individual students in each proprietary school. A listing of proprietary schools for the Portland area may be obtained from the Oregon State Department of Education, Division of School Standards.[3]

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[2] Association of Oregon Private Vocational Schools, 210 Liberty Street, SE, Salem, Oregon. Ellis J. Drake, President.

[3] Oregon Department of Education, Salem Division of School Standards, Dennis Patch, Consultant. Technical and Vocational Training Opportunities in Oregon, 1966, the Department.

Questionnaires should be administered to all resident day and night school students enrolled in a course of study leading to entry into a specific occupation. Information on students enrolled in correspondence courses may also be obtained from each correspondence agency as part of a separate study. The significance and potential use of this latter data would be determined by the number of these courses which may be considered part of a specific program leading to job entry and whether or not the student was enrolled in the course for this reason.

Apprenticeship Training

The Bureau of Apprenticeship and Training for Oregon maintains a file on all indentured apprentices in its Portland office.[4] This file contains information on the type of training program, the school attended, and the employer for each apprentice. Regional apprenticeship offices located in several cities of the state are able to provide more detailed information on specific students. The names and addresses of both the state and federal representatives in each of these regional offices may be found in Supplement C of this section p. 208). A cooperative agreement exists between the state and federal apprenticeship agencies for reciprocal servicing of apprenticeship programs throughout Oregon.

Approximately 2300 persons are currently enrolled in apprenticeship training in Oregon. Though each apprentice is employed at his trade, he also attends classes in day or night school sessions. The community colleges and local school districts of Oregon service approximately 90% of all students engaged in apprenticeship programs. Thus, it was considered easier to identify and survey the apprentice as a student rather than as an employee. In addition to this factor, it was assumed that most apprentices are in the younger age groups with limited work experience and that their potential contribution to the labor force as seen through their training efforts, aspirations and goals would be more significant to the study.

Those apprentices attending a community college program will be surveyed as part of the community college student survey. Apprentices who are receiving their training at local high schools will be included in the adult education program survey of the individual district.

Formal arrangements for administering the questionnaire to these groups should be made with the superintendent of the district, or the Dean of Focational Instruction for the community college at the same time that arrangements are made for other surveys.

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[4] Bureau of Apprenticeship and Training, Room 466, State Office Building, 1400 SW Fifth, Portland, Oregon. Theodore J. Frye, Acting Director.

Manpower Development and Training Act Program

Manpower Development and Training Act programs are coordinated by the State Department of Education and the Oregon Employment Service. Training is offered through cooperative arrangements between the agencies and local industries. In view of the fact that a large part of this is on-the-job training, it is recommended that this population be surveyed as employees rather than as students. A listing of firms and individuals participating in the program may be obtained from either the Department of Education[5] or the Oregon Employment Service.[6]

Since the sample populations for the employee and employer survey are to be randomly selected, it is further recommended that trainees in manpower development programs be surveyed as a separate segment of the labor force, thereby permitting the development of specific data on the characteristics of this group.

Vocational Rehabilitation Programs

Vocational rehabilitation programs are administered by the Division of Vocational Rehabilitation under the State Department of Education, in cooperation with the local offices of the Employment Service. Most of these programs are of a highly individualized nature specifically tailored to mee the special needs of handicapped persons. The length of time required to complete the training program is dependent upon the initiative of each individual. In view of the fact that these programs are oriented to the individual interests and abilities of the student, that they are highly informal, and that they constitute a very minimal segment of the total human resources for the state, the rehabilitation trainees were excluded from the pilot study. This data can perhpas be obtained more efficiently at a later time.

Community College Students

The student questionnaire is to be administered to all students attending community college in the pilot study area. This includes resident students in day and/or night school vocational technical programs, adult education students, and those enrolled in college in college transfer programs. The great diversity in this student population will present some problems for administering the questionnaire. Students may be enrolled in vocational as well as "transfer" courses, and attending both day and night school classes. As such, considerable organization will be necessary if duplication of student responses is to be avoided.

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[5] Oregon Department of Education, Division of Community Colleges and Vocational Education. MDTA Programs, Kerby Brumfield, Consultant, Salem, Oregon.

[6] Oregon Employment Service, State Department of Labor, 403 Labor and Industries Building, Salem, Oregon.

Where automated methods are used for recording and processing institutional data in the community colleges, easy access may be gained to such information requested in the questionnaire as student identification, place of residence and past achievement records by subject matter area. Though these records may produce only part of the total data needed, use of this information would shorten the questionnaire and reduce administration time. However, a blanket administration of the questionnaire would be necessary to obtain all the information requested from each student.

Efforts should be made to obtain a 100% sample of all students. Students absent on the day the questionnaire is administered may be identified through attendance records. A follow-up of these students should be made on the next day of their return. The number of students not completing the questionnaire during specified time limits should be identified and a per cent of the total student body determined.

Qualified personnel should be hired to administer the community college student questionnaire. Where it is impractical to hire outside personnel, inservice training programs should be conducted for the community college counselors or other members of the instructional staff in the procedures for administering the questionnaire. In this manner, more uniform administration techniques will be used by proctors.

Dropout Questionnaire

The dropout survey is to be administered to those previously enrolled high school students between the ages of 14 and 18 who have not completed the requirements for graduation. For the purposes of this study, a high school dropout has been defined as a student who has been enrolled in high school, but who has left before graduation for reasons other than illness and has failed to re-enter any high school.

School dropouts often move to other cities or states. Some may re-enter high school; some may find jobs or enlist in the Armed Servi Services. If transcripts of credits are requested from the home school, re-entrants may be identified. However, to determine the status of those who have left the community and for whom no school records have been requested would require an individual follow-up. Whatever their school status, those leaving the pilot area or the state are no longer part of the human resources of that area or the state and, therefore, need not be included in this survey. Thus, in terms of the study, the population of dropouts is to include those students who left school during the past 22 months immediately prior to the date of initiating the survey and who are presently residing in the pilot study area.

A summary of the 1965-66 statistics for grades 9 through 12 in the State of Oregon[7] showed a total of 3,282 dropouts, or approximately 2.8% of the state's average daily membership of these grades. A 1967 report on education in Oregon[8] indicates there were 5,500 dropouts in the year of 1966-67. In the 1956-66 school year, approximately 35,000 students were enrolled in grades 9 through 12 of the public school of Portland. Applying the 2.8% dropout ratio to this figure would indicate that nearly 1000 students dropped out of the Portland schools during that year. If a proportionate amount left in the 1966-67 school year, the two-year period would thereby provide a population universe of approximately 2,000 dropouts from which a pilot sample could be drawn.

Most of the problems of dropout studies center on ability to obtain a response which is representative of the total group. As was stated previously, many dropouts do not remain in the local community and, therefore, cannot be easily located. Students who have been expelled from school often manifest hostile attitudes towards school officials and others associated with education. Where such factors exist, it is most difficult if not impossible to obtain an adequate return of mailout questionnaires for the data to be significant.

A number of sources have been used by various agencies attempting to locate the high school dropout. Previous residence addresses may be obtained from local school districts. Former students are often located through school personnel (teachers, principals, non-certified personnel, etc.) and fellow students. Other members of the immediate family, relatives, friends, and ministers are sometimes able to help locate a dropout. The father's place of work in the local community, the local state employment agency, or labor organization are other sources of this information. The city or county juvenile department, the local draft board, and the Post Office Department may also assist in locating the dropout.

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[7] State Department of Education, Division of Administrative Services, Research Section, Salem, Oregon; Reporting Research: February 1, 1967. "1965-66 Summary of Dropouts in Grades 9 to 12."

[8] Oregon Educational Biennial Report of the State Board of Education, State Department of Education, Salem, Oregon. 1967.

Some of the agencies contacted in the search for secondary sources of information indicated dropouts are sometimes paid a minimal fee ($5 per student) to report for an office interview. This method was considered both highly successful and in the long run less expensive than other methods. Since a substantial portion of the interviewer's time is consumed traveling from house to house, office interviews would permit a larger number of personal contacts during a daily work period. The success of this approach is dependent upon selecting the proper inducement for the dropout to report for the interview.

The specific procedures used in administering the dropout questionnaire will depend largely upon the size of the sample to be surveyed, the ease of locating the dropout, and the financial resources available. If adequate financial resources are available to the project, the office interview would be the most desireable approach; however, a combination of questionnaire mailouts, household canvass, and paid interviews may be necessary to produce the desired per cent of return.

In verifying potential secondary sources of data on the dropout, it was learned that some attention has been given to this problem by a number of Oregon educational agencies in recent years. Some individual school districts have conducted annual dropout studies. The Oregon State Department of Education issues an annual high school dropout report. A study has been recently completed in Lane County, Oregon, on student dropouts in selected high schools of the county during the 1964 school year.[9] A similar study is underway in Marion County. One objective of the Personalized Education Program of the Portland School District is meeting the educational needs of dropouts. It is assumed that some measure of identifying dropouts and potential dropouts has been established for this study. Considerable assistance may be available to the PIE project in locating dropouts and developing data through a cooperative effort with other agencies currently conducting dropout studies.

The Employer Instrument

The instrument for collecting data from employers is divided into two parts. The first part seeks to determine the degree of employer satisfaction with Oregon Vocational Schools trainees, the screening and selection practices used by employers when hiring employees, the problems which employers face in obtaining qualified personnel and projected estimates of new and changing jobs. This section of the instrument is to be left with employers in large firms for completion and return at a later date. In the case of employers of very small firms, it may either be left with the employer or serve as a guide to be completed during an interview depending upon success in the field test prior to the pilot study.

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[9] Lane County Youth Project, 1901 Garden Avenue, Eugene, Oregon. Dr. Kenneth Polk, Director.

Part two of the employer instrument is designed to develop comprehensive data on specific characteristics of the existing labor force in Oregon industries. Information is requested on the age and sex distribution of workers by type of job, the number of entrant employees hired in these jobs during the past year, the number of current job openings, the number of in-plant trainees, the number of replacements needed, the number of jobs filled by promotion only and the education and experience requirements for entrance into each specific job. Since this part of the instrument is quite lengthy and will require considerable time and effort to complete, especially for large firms, it was desirable to devise a means which would facilitate this task.

The Oregon Department of Employment has developed much of the information requested in part two of the PIE Survey through its studies of Oregon manpower resources. A sample of the data collection form used by the Department of Employment is included in Supplement D (see p. 209). All data obtained through these manpower studies has been placed on IBM record cards and may be easily reproduced.

To illustrate the scope of the Department of Employment efforts, the Portland Metropolitan Area Manpower Resources Study of 1964 involved a listing of more than 18,000 employers, from which the sample of 3,100 employer units was selected. These firms were classified by both industrial group and per cent of the total employment in the specific industry. The total survey sample accounted for 67.5 per cent of all employment in the Portland Metropolitan area, with the exception of those employed in agriculture, and self-employed and domestic workers. Provision has been made for updating the manpower resource studies on a biennial basis. Current information is also available from several counties which completed manpower resource studies in the past year.

To obtain the information required for the PIE project from manpower resource studies, it would be necessary to have access to the form completed by the individual employer for the Department of Employment. This information, however, was supplied on the basis that it would be handled only by employees of the Department of Employment and would not be revealed to any other person or agency, or published in such a manner that data relating to individual companies could be identified. As such, permission of each employer participating in the Department of Employment Study would have to be obtained prior to using this data.

An agreement between the Oregon Employment Service and the State Department of Education has established procedures for mutual exchange of information by the two departments. It is recommended that the cooperative effort of each of these agencies be employed to secure the permission of those employers participating in the manpower studies to use the data from their Department of Employment files. This would enable the same sample used by the Department of Employment to be used for the PIE Project Survey. Since most of the manpower resource studies for the counties of Oregon have been completed, a printout of the data obtained in these studies could be adapted to the PIE Employer Survey Form, Part Two. This form could then be presented to the employer for verification, updating and supplying the additional information requested in the PIE Survey which is not included in the Department of Employment questionnaire. Such a procedure would permit updating of the Department of Employment information, securing the necessary information for the PIE project, as well as minimizing the length of time necessary to complete the survey of all employers, and reduce the duplication of effort and the cost of operation to both agencies.

The Department of Employment has also been developing statewide data on the relationship of existing and projected manpower to projected occupational needs. A study has recently been completed on the impact of technology on Oregon's future labor supply and demand.[10] More than 80 occupations were selected for observation on the basis of gross employment, change of preparation requirements for workers, or being a critical skill. As a further limitation, only those occupations were considered for which pre-employment training, apprenticeship or on-the-job training were required. The results of this study are directly applicable to the objectives of the PIE project and should be familiar to the project staff.

Employee Instrument

The employee questionnaire is designed to serve both employed and unemployed workers. Information is requested from members of the labor force on their educational and work experiences, their aspirations, and their willingness to undergo further training. Those jobs which require pre-employment training, apprenticeship or other on-the-job training exclusive of the professional and managerial categories will be included in the survey. The population universe will consist of employed and unemployed workers in the technical, clerical, sales, skilled and semi-skilled occupations.

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[10] Oregon Department of Employment, Technological Change and Its Impact on the Oregon Labor Force, Salem, Oregon, November, 1966.

In most of these occupations, the population universe is too large to permit a survey of all employees in the pilot study area. In clerical occupations, for example, employment for 1966 in the Portland Metropolitan area was over 56,000 workers. Therefore, in consideration of financial limitations to the project, it is recommended that a five per cent sample of the total population be employed in the study.

The questionnaire is to be administered to employees in firms of varying size and type of industry. Either of the following two approaches may be used. The total employee population may be stratified according to major occupational category and a random sample drawn from all workers in each category covered by state employment insurance. A listing is available from the State Department of Employment of employers who hire one or more employees in all non-agricultural occupations (with the exception of a few types of domestic workers. The name and address of the employing firm and the employee may be identified through this agency. Employing firms may then be classified according to size and type of industry and geographical location within the pilot area. The questionnaire may then be administered on an individual or small group basis to all employees selected in that firm. In the case of small firms, the questionnaire may be completed in an interview with the employee.

The second procedure involves the administration of the employee questionnaire to all employees of companies selected for the employer survey. If the sample of employers in the pilot area is a random sample of the industries then it may be assumed that a random sample of the employees of those industries constitute a random sample of the employees in specific occupations. Firms could be contacted regarding the employee and employer simultaneously.

It is recommended that the questionnaire be administered to small groups of employees by competent, trained examiners. The employees must be assured of the confidentiality of their responses. A rpincipal interest of the employer is in assisting the research group to obtain the information they seek.

One problem encountered in using Portland for the pilot test involves the "commuter" from cities in nearby Washington and Clackamas Counties in Oregon and Clark County in Washington. These workers constitute a sizeable segment of the manpoer resources for Portland industries. As such they should be included in the employee survey even though they do not live within the limits of the pilot area.

The unemployed worker is most easily identified through the files of the Oregon Department of Employment. All covered employees as well as those currently eligible for or receiving unemployment compensation are listed with this agency. Excluded from this listing are those members of the labor force in agriculture, domestic occupations, and the self-employed. Further, many workers who (1) do not use the facilities of the State Employment Service, (2) are not eligible for unemployment compensation, (3) seek jobs of their own volition and initiative, or (4) utilize the services of a trade or craft union will not be identified through this agency. Thus, other such agencies as the Oregon Department of Welfare, trade or business associations and private employment agencies must be contacted to develop the population universe of unemployed workers. Arrangements should be made with each of these agencies located in the pilot area to administer the employee survey to each unemployed worker known to that agency.

Additional Information

Following the pilot study, a statewide test of the feedback system using a regional data bank is planned as phase three of the total PIE Project. A number of activities which are currently being carried on in the state and others which are in various stages of planning and development have significant implication for utilization of the data collection instruments in this part of the project. A description of these activities is given below under the heading of the appropriate instrument.

Student Questionnaire

The Oregon Total Information System (OTIS)[11] project is at present a pilot effort of the Lane County Intermediate Education District to establish an automated system for collecting and processing local school district data on school personnel, finance, facilities, programs and pupils. If successful in this initial stage, it is planned for the system to be extended to a statewide level. A statewide system of this nature would then have the capacity to meet the data needs of the PIE Phase Three Project on high school students, dropouts, and secondary educational programs and facilities. It is recommended that the progress and direction of the OTIS project be observed to determine its potential application to later developments in the PIE Project.

Automated methods of processing school records are presently used by some Oregon school districts. A listing of all agencies using data processing methods for school records may be obtained from the Oregon

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[11] Project OTIS (Oregon Total Information System), 70 East 14th Avenue, Eugene, Oregon. Lowry F. Bennett, Director.

Chapter of the Association of Educational Data Systems.[12] Local school districts usually include budget accounting, student attendance and enrollment data and grade reporting. Identification information requested in the high school and community college student questionnaire is readily available where such systems are in operation. Though this information presently constitutes only a small segment of the total data requested in this questionnaire, it is reasonable to assume that items could be included on the registration forms of high school and community college students which would answer other data needs. Inter-school and inter-agency coordination in establishing a common coding and identification system for this data would lower the operational costs of some agencies and reduce the duplication of effort by others. In addition, the data would be more easily accessible to and readily usable by many more agencies.

Although it goes beyond the basic objectives of the PIE Project it is further recommended that those conducting the pilot study be alert to potential secondary sources of data. The numerous uncoordinated research efforts of many educational institutions and agencies in the state have resulted in considerable overlapping of study efforts and consequent multiple use of the same sample population groups. Much of this duplicated effort can be reduced through cooperative research and the use of secondary data sources.

Dropout Questionnaire

Three educational agencies maintain enrollment records on high school students in Oregon. These are: (1) the local school district, (2) the Intermediate Education District, and (3) the State Department of Education. Quarterly reports are received from the high school by the offices of the Intermediate Education District and the State Department of Education. Students who withdraw from school during the year may be identified through these reports.

A special dropout report devised by the State Department of Education and the Oregon Association of Guidance and Counseling personnel is included with the quarterly attendance report for each student who leaves school during the year and does not re-enter or transfer to another school. These forms contain identification data and the reason given by the student for leaving. A copy of this report is also recorded with the State Department of Education and the Intermediate Education District Office. Dropout report forms are not, however, made out for students who fail to re-enter school after the summer months. An individual follow-up is necessary to locate these students unless a transcript of credits was requested by another school. A sample of the dropout form is included in Supplement E (see p. 211).

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[12] Oregon Association for Educational Data Systems (AEDS), Robert Brownlee, President, Supervisor of Data Processing, Springfield School District, Springfield, Oregon.

It is recommended that efforts be made to (1) ascertain the feasibility of including all or part of the PIE dropout questionnaire to the existing form or (2) obtain endorsement of the State Department of Education and the Oregon Association of Counseling and Guidance personnel on a proposal that local district counselors administer the dropout questionnaire to all students who leave school prior to completion of graduation requirements.

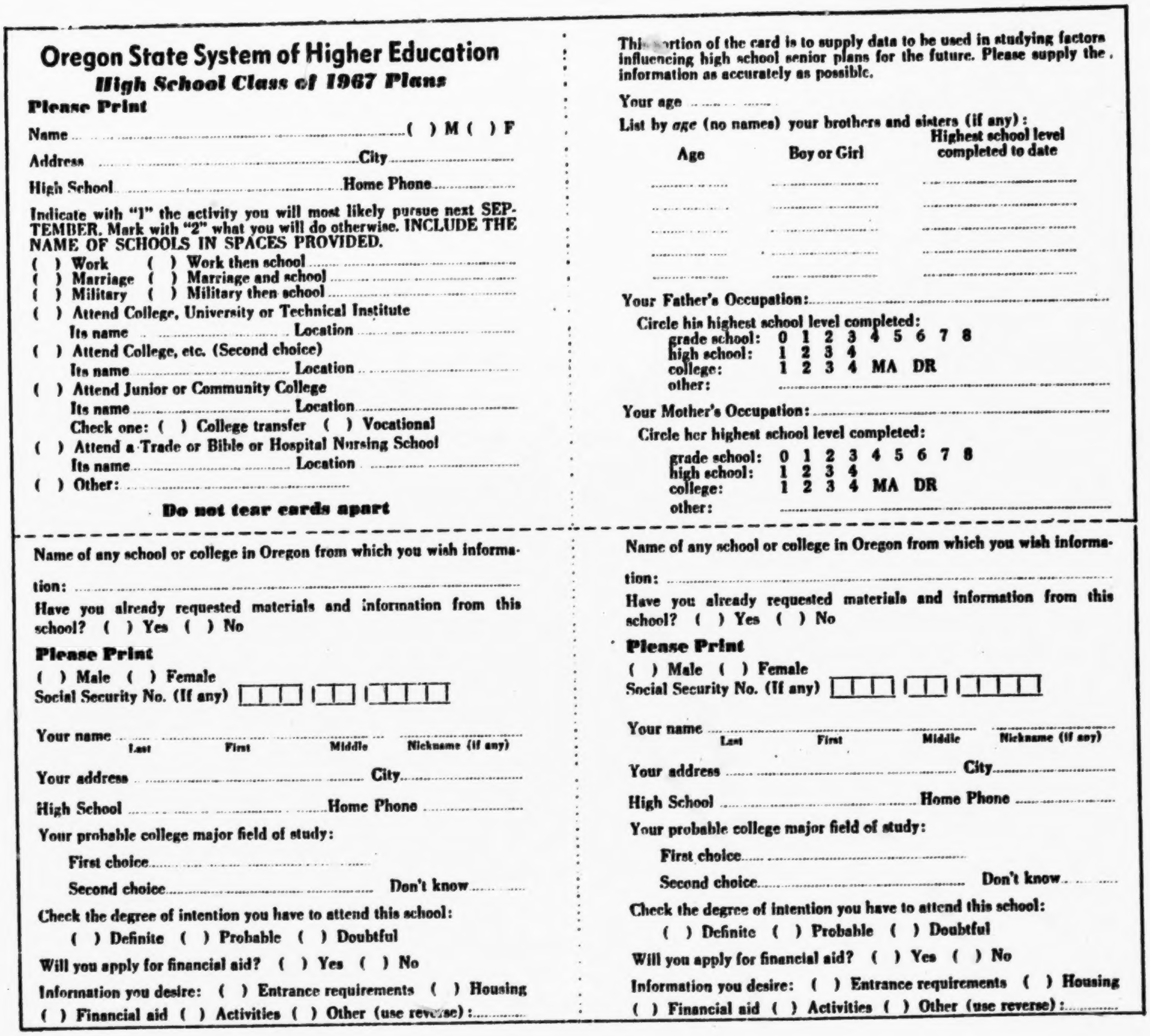
Employee Questionnaire

Unemployed persons who do not use the services of public or private employment agencies may sometimes be reached through newspaper registration campaigns. Workers seeking employment or possessing particular skills are asked to complete a registration form published in the local newspaper and return it to the office of the Oregon Employment Service. The registration form generally asks the name, address, age, and sex of the individual, and the type of job in which the worker is seeking employment or for which he is qualified.

Local offices of the Economic Opportunity Council have, in some instances, undertaken a household survey to register all unemployed persons in a community. A survey of this nature has recently been completed in Columbia County, Oregon. This was a joint effort by the Economic Opportunity Council and the State Department of Employment.

It is suggested that these approaches be used to contact unemployed workers where sufficient data is not available from local public, private, or labor employment agencies.

Supplement A



Oregon State System of Higher Education

High School Class of 1967 Plans

Please Print

Name .... ( ) M ( ) F

Address .... City ....

High School .... Home Phone ....

Indicate with "1" the activity you will most likely pursue next SEPTEMBER. Mark with "2" what you will do otherwise. INCLUDE THE NAME OF SCHOOLS IN SPACES PROVIDED.

( ) Work ( ) Work then school ....
( ) Marriage ( ) Marriage and school ....
( ) Military ( ) Military then school ....
( ) Attend College, University or Technical Institute
Its name .... Location ....
( ) Attend College, etc. (Second choice)
Its name .... Location ....
( ) Attend Junior or Community College
Its name .... Location ....
Check one: ( ) College transfer ( ) Vocational
( ) Attend a Trade or Bible or Hospital Nursing School
Its name .... Location ....
( ) Other: ....

Do not tear cards apart

This portion of the card is to supply data to be used in studying factors influencing high school senior plans for the future. Please supply the information as accurately as possible.

Your age ....

List by *age* (no names) your brothers and sisters (if any):

Age	Boy or Girl	Highest school level completed to date

Your Father's Occupation: ....

Circle his highest school level completed:
grade school: 0 1 2 3 4 5 6 7 8
high school: 1 2 3 4
college: 1 2 3 4 MA DR
other: ....

Your Mother's Occupation: ....

Circle her highest school level completed:
grade school: 0 1 2 3 4 5 6 7 8
high school: 1 2 3 4
college: 1 2 3 4 MA DR
other: ....

Name of any school or college in Oregon from which you wish information: ....

Have you already requested materials and information from this school? ( ) Yes ( ) No

Please Print

( ) Male ( ) Female

Social Security No. (If any) ☐☐☐ ☐☐ ☐☐☐☐

Your name ....
Last First Middle Nickname (if any)

Your address .... City ....

High School .... Home Phone ....

Your probable college major field of study:

First choice ....

Second choice .... Don't know ....

Check the degree of intention you have to attend this school:
( ) Definite ( ) Probable ( ) Doubtful

Will you apply for financial aid? ( ) Yes ( ) No

Information you desire: ( ) Entrance requirements ( ) Housing ( ) Financial aid ( ) Activities ( ) Other (use reverse): ....

Name of any school or college in Oregon from which you wish information: ....

Have you already requested materials and information from this school? ( ) Yes ( ) No

Please Print

( ) Male ( ) Female

Social Security No. (If any) ☐☐☐ ☐☐ ☐☐☐☐

Your name ....
Last First Middle Nickname (if any)

Your address .... City ....

High School .... Home Phone ....

Your probable college major field of study:

First choice ....

Second choice .... Don't know ....

Check the degree of intention you have to attend this school:
( ) Definite ( ) Probable ( ) Doubtful

Will you apply for financial aid? ( ) Yes ( ) No

Information you desire: ( ) Entrance requirements ( ) Housing ( ) Financial aid ( ) Activities ( ) Other (use reverse): ....

Supplement B

AGENCIES RESPONSIBLE FOR LICENSING AND/OR EXAMINING SCHOOLS, GRADUATES, OR BUSINESSES IN OREGON WHICH ARE VOCATIONAL-TECHNICAL IN ORIENTATION OR ASSOCIATION

Oregon Board of Examiners

1. Aeronautics
2. Architecture
3. Auctioneers
4. Barbers
5. Cosmetic Therapy
6. Engineering
7. Funeral Directors & Embalmers
8. Insurance
9. Landscape Architecture
10. Naturopathic Physicians (?) ORS 685.160
11. Nursing
12. Police Standards and Training
13. Real Estate
14. Watchmaking and Clockmaking

Advisory Committees Under the State Board of Health

1. Hearing Aids (?)
2. Physical Therapy
3. Home Nursing Administrators (?)

Advisory Committees Under the Bureau of Labor

1. Apprenticeship Council

Supplement C

REGIONAL APPRENTICESHIP REPRESENTATIVES

State and Federal programs are serviced via cooperative agreement of both agencies. State and Federal employees are listed below as obtained from the Salem office, Bureau of Labor, 115 Labor & Industries Building, Salem, 97310, Phone: Ext. 540. This information is subject to revisions of 1967 Legislature - State Employees.

State Employees

Region	Representative	Address
Portland	Theo. J. Fry, Acting Director	Bureau of Apprenticeship and training, Room 466, State Office Bldg., 1400 SW 5th Portland, 97201
Salem	William R. Shuck, Rep.	Rm. 115, Labor & Industries Bldg., Salem 97310
Eugene	Wayne Douglas, Rep.	Room 2 State Office Building 7th & Pearl, Eugene
Coos Bay	H. H. Hill, Rep.	Room 3, 68 Central Ave. E.
Medford	Frank A. Smith, Rep.	Room 24, D'Anjou Bldg. 328 S. Central
Pendleton	J. Rhodes	Room 102, State Office Bldg.

Federal Employees

Portland	Roy T. Carver, Director Fritz Krabler, Rep. Carl Sorenson	Room 307, Bureau of Apprenticeship & Training Old U.S. Courthouse 520 SW Morrison St. Portland, 97204
Salem	James Armstrong	Room 115, Labor & Industries Bldg., Salem
Eugene	Fred Koehler	Bureau of Apprenticeship & Training, U.S. Dept. of Labor, 835 E. Park (Wiley Bldg.), Eugene

Supplement D

EMPLOYER CONFIDENTIAL REPORT

MORROW AND UMATILLA COUNTIES

INDIVIDUAL FIRM DATA WILL NOT BE DISCLOSED IN ANY MANNER

1. TOTAL NUMBER OF EMPLOYEES ON PAYROLL FOR PAY PERIOD ENDING NEAREST OCTOBER 15, 1964 ______________.
NUMBER REPORTED ON UNEMPLOYMENT INSURANCE TAX REPORT FOR OCTOBER 1963 ______________.

Name of Person Completing this Form ______________

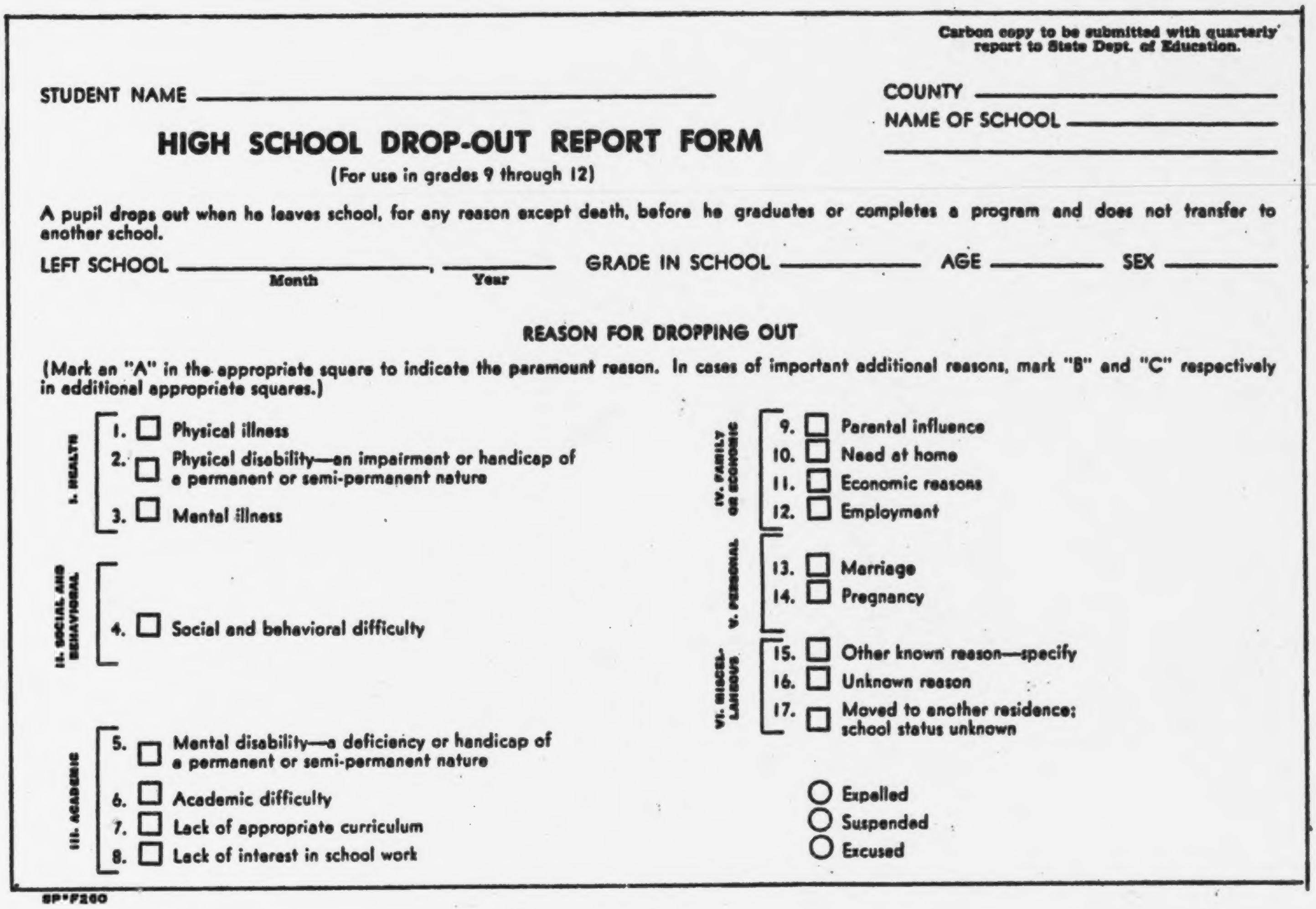
Title ______________

		CURRENT EMPLOYMENT									ESTIMATED EMPLOYMENT		NUMBER OF TRAINEES EXPECTED TO COMPLETE TRAINING DURING		Indicate Your Requirements when Hiring (See Instructions)									
MAKE NO ENTRIES IN THIS COLUMN	JOB TITLE PLEASE LIST TITLES OF ALL THE DIFFERENT OCCUPATIONS ON YOUR PAYROLL. ALSO LIST THE TITLES OF ANY JOBS YOU EXPECT TO ADD IN THE NEXT FIVE YEARS. LIST TRAINEE POSITIONS	Total EMPLOYMENT EACH OCCUPATION	NUMBER OF FEMALES	WORKERS BY AGE GROUPS - BOTH SEXES						NUMBER OF CURRENT VACANCIES	TWO YEARS HENCE	FIVE YEARS HENCE	NEXT TWO YEARS	NEXT FIVE YEARS	PROMOTIONAL ONLY	Training							Experience	
				UNDER 25	25 TO 34	35 TO 44	45 TO 54	55 TO 64	65 AND OVER							NONE REQUIRED	HIGH SCHOOL GRAD	TRADE SCHOOL GRAD	BUSINESS SCHOOL	COLLEGE DEGREE	COLLEGE YEARS	APPRENTICESHIP YRS	NOT IMPORTANT	LENGTH OF EXPERIENCE
	2	3	4	5-A	5-B	5-C	5-D	5-E	5-F	6	7	8	9-A	9-B	10	10-A	10-B	10-C	10-D	10-E	10-F	10-G	11-A	11-B

DATA PROCESSING CODE SHEET
AREA MANPOWER SURVEYS

ITEM		ENTRY	CARD COLUMN
COUNTY		_ _	1-2
FIRM NAME		_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	3-18
INDUSTRY CODE		_ _ _ _	19-22
INDUSTRY DIVISION:	Div. - Ind. 01 - 10 02 - 15 03 - 16 04 - 17 05 - 2411 06 - 2421 07 - 2432 08 - Other 24 09 - Other Mfg 10 - 40 11 - 42 12 - Other TCPU 13 - 50 14 - 53 15 - 54 16 - 55 17 - 58 18 - Other Trade 19 - 60 20 - Ins x RE Sales 21 - Other FIRE 22 - 70 23 - 72 24 - 73 25 - 80 26 - 80 - NC 27 - Oth Serv & Misc. 28 - Oth Serv - NC 29 - 91 30 - 92 31 - 93 Ed 32 - 93 Non-Ed	_ _	23-24
SAMPLE GROUP:	1 - Large Covered 2 - Medium Covered 3 - Small Covered 4 - Local Government Education 5 - Local Government Non-Education 6 - Non-Covered Industries	_	25
OCCUPATIONAL CODE		_ _ _ _ _ _	26-31
TOTAL EMPLOYMENT IN OCCUPATION		_ _ _	32-34
NUMBER OF FEMALES IN OCCUPATION		_ _ _	35-37
EMPLOYMENT BY AGE GROUP:	Under 22 or 25	_ _ _	38-40
	22 or 25 to 34	_ _ _	41-43
	35 - 44	_ _ _	44-46
	45 - 54	_ _ _	47-49
	55 - 64	_ _ _	50-52
	65 & Over	_ _ _	53-55
NUMBER OF CURRENT VACANCIES		_ _	56-57
ESTIMATED EMPLOYMENT 2 YEARS HENCE		_ _ _ _	58-61
ESTIMATED EMPLOYMENT 4 YEARS HENCE		_ _ _ _	62-65
NUMBER OF TRAINEES COMPLETING IN 2 YEARS		_ _ _	66-68
NUMBER OF TRAINEES COMPLETING IN 4 YEARS		_ _ _	69-71
TRAINING REQUIREMENTS:	01. None Required 02. High School Grad 03. Trade School Grad 04. Business Sch. Grad 05. 1 Year of College 06. 2 Years of College 07. 3 Years of College 08. Some College 09. College Degree 10. 1 Year Apprent. 11. 2 Years Apprent. 12. 3 Years Apprent. 13. 4 Years Apprent. 14. 5 Years Apprent. 15. Some Apprent. 16. Any Combination 20+ Elective & Training Req. 50+ Promotional & Training Req.	_ _	72-73
EXPERIENCE:	0. Not Important; 1. 1 Year; 2. 2 Years, etc.	_	74

Supplement E



Carbon copy to be submitted with quarterly report to State Dept. of Education.

STUDENT NAME ____________________

COUNTY ____________________

NAME OF SCHOOL ____________________

HIGH SCHOOL DROP-OUT REPORT FORM

(For use in grades 9 through 12)

A pupil drops out when he leaves school, for any reason except death, before he graduates or completes a program and does not transfer to another school.

LEFT SCHOOL ____________ (Month), ________ (Year) GRADE IN SCHOOL ________ AGE ________ SEX ________

REASON FOR DROPPING OUT

(Mark an "A" in the appropriate square to indicate the paramount reason. In cases of important additional reasons, mark "B" and "C" respectively in additional appropriate squares.)

I. HEALTH
- 1. ☐ Physical illness
- 2. ☐ Physical disability—an impairment or handicap of a permanent or semi-permanent nature
- 3. ☐ Mental illness

II. SOCIAL AND BEHAVIORAL
- 4. ☐ Social and behavioral difficulty

III. ACADEMIC
- 5. ☐ Mental disability—a deficiency or handicap of a permanent or semi-permanent nature
- 6. ☐ Academic difficulty
- 7. ☐ Lack of appropriate curriculum
- 8. ☐ Lack of interest in school work

IV. FAMILY OR ECONOMIC
- 9. ☐ Parental influence
- 10. ☐ Need at home
- 11. ☐ Economic reasons
- 12. ☐ Employment

V. PERSONAL
- 13. ☐ Marriage
- 14. ☐ Pregnancy

VI. MISCEL-LANEOUS
- 15. ☐ Other known reason—specify
- 16. ☐ Unknown reason
- 17. ☐ Moved to another residence; school status unknown

○ Expelled
○ Suspended
○ Excused

SP*F260

APPENDIX G

Task Descriptions for Basic Tasks

No. 1
Hamreus
9-9-66

Art Jones
Albina Shipbuilding

TASK DESCRIPTION

Job Title: Draftsman (Marine)

Task Name: Develop drawing of hull of Submarine Mothership

Object Acted Upon: Drawing

Information Guiding Action: Customer blue prints and specs - recall; handbooks

Tools: Drawing tools

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with customer to determine nature of job.
B4-8, B5-4, B3-7	2. Read and analyze architect's sketchs and specifications furnished by customer to understand job elements and to identify obvious errors.
B6-9	3. Determine plan of action.
B5-7, B4-4	4. Classify all types of steel required in total construction.
B4-3, B3-7	5. Calculate exact quantities of steel according to class.
B5-8, B6-9	6. From sketchs and specifications furnished, determine types and numbers of detail drawings required to build all component parts.
B5-7, B6-8	7. Determine layout plan for each detail drawing.
B4-2, A1-2	8. Procure necessary materials to start drawing: paper, tools, etc.
A8-5	9. Set up drawing board.
B5-7, B6-8	10. Determine scale size of drawings.
B3-7, A7-5	11. Calculate and locate start points of drawings.
B4-7, B3-8, B1-4	12. Make estimates for structural strength to conform to American Bureau of Shipping (ABS) and U.S. Coast Guard.
B4-7, A7-5, B4-4 B2-3	13. Using information from architect's sketchs and specifications and other references, draw complete layout details for each component part.

No. 1

Develop drawing of hull of Submarine Mothership Cont'd

B5-7, B1-4	14.	Following completion of detail drawings, make systematic and complete check for errors.
C3-3, B4-3	15.	Drawings discussed with shop supervisor for start of fabrication.

No. 2
Hamreus
9-2-66

Robert Latham
Drawing Layout

TASK DESCRIPTION

Job Title: Junior Draftsman (mechanical)

Task Name: Drawing layout from engineer's sketch

Object Acted Upon: Drawing

Information Guiding Action: Sketch from engineer, recall, other technical references

Tools: Instruments, drafting machine, pencils, lettering devices, inking equipment, erasing machine, template, zip, print copier

Actions: Executes a procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with engineer to understand sketch for layout job.
B5-4, B6-7	2. Analyze sketch to determine layout plan of action.
B5-2, A1-2	3. Procure necessary materials: drawing paper, references and tools.
A8-5	4. Attach paper to drawing board.
B3-7, B6-8	5. Determine scale of layout and plan location on paper.
B3-7, A7-5	6. Calculate and locate start point on paper.
B4-7, B4-4, B3-7	7. Calculate layout detail sizes using engineer's sketch and references.
B2-3, A7-5	8. Draw complete layout.
B5-7	9. Check total drawing for accuracy.
C3-8, B4-3	10. Meet with engineer to transmit details of completed layout.

No. 3
Beard
9-30-66

Jeppsen and Miller
Architects

TASK DESCRIPTION

Job Title: Draftsman (Electrical)

Task Name: Lighting layout for Linn County Court House

Object Acted Upon: Drawings

Information Guiding Action: Specifications from architect, consulting firms and technical references.

Tools: Parallel bar, Draftsmen's triangle, various pens, pencils.

Actions: Executes a procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with architect and customer to understand sketches and notes for layout job.
B5-4, B6-7	2. Analyze data and determine layout plan of action.
B4-2, A1-2	3. Procure needed drawing materials: paper, tools, references.
A8-5	4. Secure paper to board.
B5-4, B6-7	5. From sketches and specifications provided, determine types and numbers of detail drawings required for total job.
B3-7, B6-7, B4-4	6. Determine scale of layouts and plan locations on paper.
B3-7, A7-5, B2-3	7. Calculate start point and draw in floor plan to scale.
B4-7, B4-2, B3-7	8. Using specifications provided and found in references, determine light level requirements for all areas.
B5-3, B4-4	9. Translate light values into appropriate fixture types.
B5-7, B6-8	10. Determine exact placement of fixtures on basic plan.
B4-3, A7-5	11. Draw complete layout details for each component part.
C3-2, B4-3	12. Give completed drawings to lighting engineer and communicate necessary details.

No. 4
Hamreus
8-18-66

Gary Olin
Bingham Pump

TASK DESCRIPTION

Job Title: Draftsman - Mech - (Hydraulic)

Task Name: Drawing pump case layout

Object Acted Upon: Drawing

Information Guiding Action: Engineer's drawings, sketches, notes, recall, references

Tools: pencils, traingles, scales, drafting machine, compass

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with engineer to understand sketches and notes for layout job.
B5-7, B6-8	2. Analyze data to determine plan of action.
B4-2, A1-2, A8-5	3. Procure drawing paper and secure to board.
B4-7	4. Find old drawings of similar nature for reference.
B5-7, B6-8	5. Using data and past drawings, determine approximate configuration of new drawing.
B3-7, B5-7, B6-8	6. Estimate scale of layout and plan location on paper.
B6-7, A7-5	7. Determine start point and place center line.
B5-7, B4-4, A7-5	8. Copy relevant parts of old drawings where appropriate.
B2-3, A7-5	9. Translate new data into rough approximate drawings.
B2-2, A7-5	10. Detailed translation of values from rough drawing onto working drawing.
B5-7	11. Check completed layout for accuracy.
C3-2, B4-3	12. Return drawing to engineer and communicate necessary details.

No. 5

Jim Strang
Int. Harvester

TASK DESCRIPTION

Morse
9-30-66

Job Title: Motor Truck Servicing

Task Name: Major tune-up

Object Acted Upon: Diesel engine

Information Guiding action: Recall, manual

Tools: Hand tools, specialize shop tools, torque wrench

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
B4-3, B1-4	1. Read work order to understand nature of problem.
B4-7	2. Determine plan of action for repair.
B1-2, A1-2, A4-5, B1-4	3. Remove valve covers and adjust injectors according to specifications with torque wrench and feeler gauge.
B1-2, A4-5, B1-4	4. Remove fuel pump from engine, clean gasket surfaces and replace filter and gaskets.
A4-5	5. Assemble fuel pump on engine.
A5-2	6. Start up engine.
B1-4, A4-5, B1-4	7. Inspect fuel pump for leaks and inspect and adjust throttle linkage to conform to specifications.
B1-2, A6-2, B4-4, A4-5, B1-4	8. Attaching a tachometer, determine governor operation at both ends of its range and adjust according to specifications.
B1-2, A4-5, B1-4	9. Inspect and tighten all electrical connections on fuel control solenoid.
A4-5	10. Replace all removed parts on engine.
A5-2, B5-4	11. Start up engine and analyze operation for proper performance.
B3-7, B2-3	12. Estimate and record time and effort and parts used.

No. 6
Morse
9-30-60

Jim Strang
Int. Harvester

TASK DESCRIPTION

Job Title: Motor truck servicing

Task Name: Airbrake relining

Object Acted Upon: Air brake mechanism

Information Guiding Action: Recall, manual

Tools: hand tools, wheel bearing wrcnch, wheel jack

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
B4-2, B5-7	1. Read work order to understand nature of problem.
B6-7	2. Determine plan of action for repair.
B1-2, A4-5, A1-2	3. Jack up vehicle on side requiring relining.
B1-2, A4-5, A1-2	4. Remove axle shafts, wheel bearing retainer nuts, and wheel from truck.
A4-5, A1-2	5. Disconnect and remove faulty brake shoes.
B1-2, A1-2	6. Obtain replacement lining according to factory specification.
A1-2, A4-5, B1-4	7. Remove worn lining and replace with new.
B5-4	8. Inspect all brake activating mechanisms for improper wear or adjustment.
A4-5, B1-4	9. Replace faulty parts and adjust brake activating mechanisms and assemble brake shoes on truck.
B1-4	10. Inspect brake drums to determine wear.
B1-2, A6-5, A1-2 B1-4	11. Refinish scored drums depending on degree of scoring.
B1-2, A4-5, B4-4	12. Replace wheel, wheel bearing and retainer nuts, adjusting to "feel".
A4-5	13. Replace axle shafts.
B1-2, A4-5, B1-4	14. Adjust brake to proper fit according to specifications.
B5-7, A5-2, A4-5 B1-4	15. Analyze for proper braking action in road test and make necessary adjustment as required.
B2-3	16. Record time and effort and parts used.

No. 7
Morse
9-22-66

Clarence Miner
Webb & Anderson Garage

TASK DESCRIPTION

Job Title: General Mechanic (Automotive)

Task Name: Major tune-up

Object Acted Upon: Automobile Engine

Information Guiding Action: Recall, Manual, customer input

Tools: Hand tools, Compression gauge

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with customer to understand problem.
B5-7, B6-7	2. Analyze problem and determine work required
B4-4, B3-7	3. Estimate cost of repair
C3-3, C8-7	4. Communicate estimate to customer and reach agreement for approval.
B4-7	5. Recall plan of action for major tune-up.
B1-2, A4-1, A4-5, B1-4	6. Remove spark plugs with wrench and check cylinder compression.
B1-2, A4-1, A6-5, B1-4	7. Remove fuel pumps with wrenches and check pumping pressure against factory specifications.
B1-2, A4-2, A4-5 B1-2	8. With proper tools, tear-down fuel pump, replace filter, clean screen and reassemble.
B1-2, A1-2, A4-2	9. With proper tools, remove carburator, tear-down, and place in cleaner.
B4-2, A1-2, A4-5, B1-4, B2-2	10. With proper tools, remove distributor; inspect shaft, springs and weights for wear and/or breakage; and replace needed parts.
A6-5, B1-4	11. Check distributor vacuum control with proper equipment.
B1-2, A1-2, A4-5	12. With proper tools, remove old points and condenser and replace with new set.
B1-2, A4-5, B1-4	13. With proper tools, set gap of points according to specifications.
A1-2, A4-5, B1-2	14. Assemble distributor and replace on engine.
B4-2, A6-5, B1-4	15. With ohmeter, check plug wires for faults.

No. 7

Major tune-up Cont'd

B1-4, B2-2, A4-5	16. Inspect plugs for wear, replace faulty ones, and gap to specifications.
A1-4	17. Clean battery terminals, free up and lubricate heat riser.
B1-2, A4-5, B1-2	18. With new "kit," replace all moving parts in carburator, and reassemble carburator.
B1-2, A4-5	19. Adjust carburator to specifications.
B1-2, A1-2, B1-4 A4-5	20. Remove carbon from engine carburator orifices and remount carburator on engine.
A5-2, B1-4, A4-5	21. Start engine and adjust choke.
B1-2, A6-5, B4-4	22. Connect tune-up machine, adjust dwell to meet specifications.
B1-2, A6-5, B4-4	23. Connect timing light and adjust timing to meet specifications.
B1-2, A6-5, B4-4	24. Using tachometer, adjust spark advance.
A4-2, B1-4	25. Make final carburator adjustment by feel.
B1-2, A1-2, A4-5, B1-4	26. With proper tools remove valve cover, adjust tappet gaps to specification and replace cover.
B1-4, A4-5, B1-4	27. Check and adjust fan belt and voltage regulator according to specifications.
A5-6, B1-5, A4-5	28. Road test car and make final adjustments.
B2-3	29. Record mileage on lube sticker.
B2-3, B3-7	30. Record time and effort and parts used and calculate cost of work.
C3-2, B4-3, C8-7	31. Communicate performance information to customer and reach agreement on billing.

No. 8
Morse
6-22-66

Clarence Miner
Webb & Anderson Garage

TASK DESCRIPTION

Job Title: General Mechanic (automotive)

Task Name: Front transmission bearing replacement

Object Acted Upon: Transmission of automobile

Information Guiding Action: Recall, reference manual

Tools: Hand tools

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with customer to understand problem.
B4-7	2. According to problem, determine work needed.
B3-7, C3-3, C3-8	3. Estimate cost and communicate to customer for approval.
B6-7	4. Determine plan of action.
A6-5, A1-2	5. Elevate car on lift.
B1-2, A1-2, A4-5	6. Select tools and remove drive shaft, shaft linkage and speedometer cable from transmission.
B1-2, A1-2, B1-4	7. Raise engine with jack to get weight off rear mount.
B1-2, A1-2, A4-5	8. Select tools and disconnect rear engine mounts, disconnect transmission from engine and remove.
B1-2, A1-2, A4-5	9. With proper tools, drain oil from transmission casing and remove in order: casing cover, front bearing retainer, drive gear, bearing assembly, lock nut and faulty bearing.
B1-2, C3-3, A1-2	10. According to specifications, obtain new bearing and casing gasket.
A4-5, B1-4	11. Replace new bearing and lock nut to meet tolerance specifications.
B1-2, A4-5, B1-4	12. Center punch lock nut to secure.
A4-5, B1-4	13. Replace drive gear, bearing assembly, and front bearing retainer, insert new gasket and replace casing cover.
A4-5, B1-4	14. Replace and secure transmission and rear engine mounts in automobile, and lower engine onto mounts and secure.

No. 8

Front transmission bearing replacement Cont'd

B1-2, A1-2, A4-5	15.	Fill transmission with correct weight oil.
A4-5, A6-5	16.	Secure all remaining engine parts and remove car from lift.
A5-6, B4-4	17.	Road test car.
B2-3, B3-7	18.	Record time and effort and materials used and calculate cost.
C3-3, C8-8	19.	Communicate essential information to customer and arrange for billing.

No. 9
Hamreus
9-14-66

Neil Selander
Automotive Repair

TASK DESCRIPTION

Job Title: Automotive Electrician

Task Name: Engine Tuning: Major

Object Acted Upon: Engine

Information Guiding Action: Recall, reference manuals, customer

Tools: Hand tools, (compression gage, timing light,) oscilloscope

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with customer to understand problem.
B5-7, C3-3	2. Determine work needed, communicate to customer.
B3-7	3. Estimate cost of work.
C3-2, C8-7	4. Reach agreement of cost with customer.
B4-7	5. Determine plan of action.
B1-2, A1-2, A4-5	6. Select proper wrench and remove plugs.
B1-3, A1-2	7. Inspect plugs for wear and burn, discarding bad ones.
B1-4, A6-5, A4-5	8. Attaching proper equipment, check compression of each cylinder.
B1-2, A4-5, A1-2	9. With proper wrenches, remove distributor from engine and disassemble.
B1-2, A4-5, A1-2	10. Disconnect external carburetor connection, remove from engine, disassemble, and place in cleaning solution.
B1-2, A4-5, B1-4	11. Clean and service and assemble distributor according to manufacturer's specifications: lubricate cam, replace points and condenser, inspect shaft for wear, check and replace worn primary and coil wires, tune up point alignment, set point gap, replace rotor.
B1-2, A4-5, B1-4	12. Remove carburetor parts from cleaner, service with kit replacing all working parts and gaskets and assemble and bench adjust according to manufacturer's specifications.
B1-4, B1-2, A4-5	13. Inspect PCV (positive crancase ventilating) valve for oil leak and replace if faulty.
B1-4, A1-2, A4-5	14. Clean dirty plugs, gap new and old plugs and install in engine.

No. 9

Engine Tuning: Major Cont'd

A4-5, B1-4	15.	Replace carburator and distributor on engine connecting all parts.
B1-4, A1-2	16.	Check and lubricate heat riser.
B1-2, A4-5	17.	Attach oscilloscope according to manual.
A5-2, A6-2, B4-4 A4-5	18.	Start engine and adjust timing according to oscilloscope data.
A6-2, B4-4, B1-2, A1-2	19.	Test plug and coil wires, replacing any faulty ones.
A6-2, B4-4, A4-5 B1-4	20.	Test distributor point gap and make adjustments to meet specifications.
A6-2, B4-4, A4-5, B1-4	21.	Adjust carburator according to manual.
A5-2, B1-4	22.	Road test car for performance.
B2-3	23.	Record time and effort and parts used.
B3-7	24.	Calculate cost of work.
C3-2, C8-8	25.	When customer returns, communicate work done and reach billing agreement.

No. 10
Morse
9-22-66

Neil Selander
Autcmotive Repair

TASK DESCRIPTION

Job Title: Automotive Electrician

Task Name: Starter Overhaul

Object Acted Upon: Starter

Information Guiding Action: Check type of problem, recall

Tools: Hand tools, voltmeter, small lathe, growler

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with customer to understand problem.
B5-7, C3-3	2. Analyze nature of problem, communicate to customer.
B3-7	3. Estimate cost of repair.
C8-8	4. Reach agreement with customer on cost of repair.
B4-7	5. Determine plan of action for overhaul.
B1-2, A1-2, A4-5	6. Select proper tools, disconnect all electrical cables and remove starter from engine.
B1-2, A4-5	7. Dissasemble starter motor.
B1-2, A6-5, B4-4	8. Test solenoid for malfunction.
A1-2	9. Clean metal parts of starter with solvent.
A4-5, B1-4	10. Test armature for shorts on grounder apparatus.
B1-2, A4-4, A6-5 A4-4	11. Set armature into lathe, turn commutator for trueness and undercut mica.
A6-5, A4-2, A1-4	12. Sandpaper undercut to smooth.
B1-2, A4-2, B1-4	13. Replace brushes in case according to specifications.
B1-2, A4-2, A1-2	14. Pack all bearings and bushings with grease.
A4-5, A1-2	15. Assemble starter motor.
B1-2, A6-5, B4-4	16. Test starter for proper operation according to specifications.
A4-5, B1-4	17. Replace starter on engine and connect electrical cables.
A5-2, B4-4	18. Test starting on car.

No. 10

Starter Overhaul Cont'd

B2-3, B3-7	19. Record time and effort and materials used and calculate cost.
C3-3, C8-8	20. When customer arrives, communicate work done and reach billing agreement.

No. 11
Morse
9-30-66

Art Dick
White Truck Service

TASK DESCRIPTION

Job Title: Motor Truck Repair

Task Name: Major diesel tune-up

Object Acted Upon: Diesel engine

Information Guiding Action: Recall, specification manual

Tools: Hand tools, torque wrench, feeler gauges

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with supervisor to understand nature of problem.
A5-2, B5-7	2. Analyze engine operation to determine repair need: engine sound, horsepower rating, smoke at exhaust, air filter for obstructions.
B4-7	3. Determine plan of action for repair.
B1-2, A1-2, A4-5	4. With appropriate tools, remove valve covers, rocker assembly and injectors from engine.
B1-4	5. Inspect plungers for "scoring", orifices and injectors for obstruction.
B1-2, A1-2, A4-5 B1-4	6. Following factory specifications, replace scored plungers, clear all orifices, clean and/or replace all bad injectors.
B1-2, A4-5, B1-4	7. Adjust injectors according to specification with torque wrench.
A1-2, A4-5, B1-4	8. Install all injectors in engine.
B1-2, A4-5, B1-4	9. Adjust valves with feeler gauge according to specifications.
A1-2, A4-5, B1-4	10. Remove fuel pump from engine with proper tool.
B1-2, A6-5, B1-4	11. Using pressure gauge, check fuel pump pressure.
B1-2, A4-5, A1-2	12. After inserting new filter in fuel pump, replace fuel pump on engine.
A5-2, B5-4	13. Analyze engine operation for proper performance: engine noise, horsepower rating and smoky exhaust.
B3-7, B2-3	14. Estimate and record time and effort and parts used.

No.12
Morse
9-30-66

Art Dick
White Truck Service

TASK DESCRIPTION

Job Title: Motor Truck Repair

Task Name: Generator-Voltage Regulator System adjustment

Object Acted Upon: Generator-battery-voltage regulator

Information Guiding Action: Recall, manual

Tools: Amperage, voltage-resistance unit, hand tools

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with supervisor to understand nature of problem.
B1-2, A1-2, A5-7	2. Analyze total battery system to determine where service is required: battery specific gravity, battery connections, fan belt tension, all battery and generator electrical connections.
B4-7	3. Determine plan of action for service.
B1-2, A4-2	4. Disconnect battery terminal cable from voltage regulator and ground.
B1-2, A4-2	5. Connect AVR and ammeter to voltage regulator and ground.
B1-2, A4-2, B5-7	6. Analyze "cut-out" function of regulator.
A4-2, B1-4	7. Adjust "cut-out" to conform to factory specifications
B1-2, A4-2, A6-5 B4-4	8. According to specifications set AVR to simulate regular and low battery charges and test regulation function.
B1-2, A4-5, B1-4	9. Adjust regulator to meet specifications.
B1-2, A4-2, B1-4	10. Remove AVR and connect battery cable in series with ammeter to voltage regulator.
B1-2, A5-2, B4-4	11. Start engine and check ammeter to determine whether regulator is functioning properly.
B1-2, A4-2	12. Cut engine, disconnect ammeter, connect battery cable to voltmeter and replace voltage regulator.
B2-3	13. Record time and effort and any parts needed.

Tom Dodge

No. 13
Hamreus
9-2-66

TASK DESCRIPTION

Job Title: Sheet Metal Welder

Task Name: Tack Welding

Object Acted Upon: Square to round

Information Guiding Action: Recall, blueprint specs

Tools: Welding machine and equipment, hammer 1½ lbs, dolly (back support for hammer), C clamps

Actions: Procedural - adaptation according to unique situations

Worker Function-Process		Description of Task Actions
B4-2, B5-2	1.	Analyze blueprint and job specification to determine nature of job.
B6-7	2.	Determine plan of action for tacking pieces.
B1-2, A4-5	3.	Position pieces for tacking.
B1-4	4.	Check fit-up of pieces to determine accuracy of cutting.
B5-4	5.	Determine which pieces need minor adjustments.
B1-2, A1-2	6.	Select proper hammer and dolly for making adjustments.
A4-5, B1-4	7.	Make minor adjustments to pieces with hammer and dolly.
A1-4, B1-4	8.	Re-check fit-up.
B5-2, B1-4	9.	Analyze alignment of seams to check for out-of-roundness.
B6-7	10.	Determine what pounding is needed to achieve proper roundness.
B1-2, A1-2	11.	Select correct size hammer and dolly.
A4-5, B1-4	12.	Pound shape to reach desired roundness.
B6-7	13.	Determine plan of action for clamp placements and subsequent tack welds.
B1-2, A4-5, A1-2 B1-4	14.	Fix and adjust clamps using hammers to shift pieces into desired positions.
B5-4, B1-2, A1-2	15.	Determine and select welding electrode and rods.
A6-6, B4-4	16.	Make tack welds.

Tack Welding cont'd

C3-3 17. When all tack welds have been completed communicate important information to shapers for finish work.

No. 14

Radiator Re-Coring Cont'd

A4-5, B1-2	16.	Position tanks on new core for soldoring.
A4-2, A6-4, B1-4	17.	Ignite gas torch and adjust flame for soldering.
A6-6, B4-4	18.	Solder tanks to core.
A4-5, B1-4, A6-6 B4-4	19.	Assemble side brackets on core and solder.
B1-2, A1-2	20.	Clean off solder splatters.
B1-2, A4-2	21.	Paint tanks and side brackets.
B1-2, A5-2, B1-4	22.	Assemble radiator in car.
B1-2, A5-2, B1-4	23.	Test radiator for water leaks by running car engines.
B2-3, B3-7	24.	Record time and effort and parts used and calculate cost.
C3-8	25.	When customer returns for car, billing agreements are reached.

No. 15
Morse
9-26-66

Clyde Salisbury
Body and Radiator Repair

TASK DESCRIPTION

Job Title: Auto body repair

Task Name: Auto body welding repair

Object Acted Upon: Auto body

Information Guiding Action: Recall, Manuals

Tools: Gas torch, bumping tools (hammers, etc.), heating torch power tools, electric sander, dollies . .

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
C3-2, B4-3	1. Meet with customer to understand work desired.
B5-7, C3-3	2. Overlook job (analyze work to be done); identify for customer.
B4-2, B3-7	3. Estimate cost of repair.
C3-3, C8-8	4. Reach agreement with customer on cost of repair.
B5-8	5. Determine plan of action for preparing surface.
B1-2, A1-2	6. Select size hammers and dollies needed to hammer out dents.
A4-5, B1-4	7. Hammer out dents to re-shape surface.
B1-2, A1-2, A6-5 B1-4	8. Select heating torch tip. Heat torn metal with gas torch to draw metal parts together.
B1-2, A6-5, B1-4	9. Sand or file surface to make it smooth.
B5-8	10. Determine plan of action for welding.
B1-2, A1-2	11. Select torch tip and rod for welding tear.
A1-2, A6-5, B1-4	12. Ignite and adjust acetylene torch.
A6-6, B4-4	13. Heat area of tear until metal starts to run.
A6-6, B4-4	14. Apply welding rod filling tear while maintaining heat with torch.
B5-8	15. Determine plan of action for final surface preparation.
B1-2, A6-5, B1-4	16. When weld is cool, sand weld area until smooth.
B5-4	17. Identify rough spots or impressions needing filling.

No. 15

Auto body welding repair Cont'd

Bl-2, A4-5, Bl-4	18. Fill spots with plastic using spreader tool or solder.
Bl-2, A6-5, Bl-4	19. Sand all areas to achieve proper smoothness and contour.
C3-3	20. Send out to be painted.
C3-2	21. When painting is completed, customer is notified to come for car.
B2-3, B3-7	22. Record time and effort and materials used and calculate cost of work.
C3-3, C8-8	23. When customer arrives for car, completed work explained and necessary arrangements for billing are agreed upon.

No. 16
Hamreus
8-29-66

Circle

TASK DESCRIPTION

Job Title: TV-Radic Service

Task Name: Home call resulting in TV repair in shop

Object Acted Upon: TV, Color

Information Guiding Action: Customer phone call, recall, technical manuals, data from test equipment, credit references

Tools: Shop tools, special color TV kit equipment

Actions: Exploratory in home, sales job, (to remove set from house), shop service procedure, discussion of costs.

Worker Function-Process		Description of Task Actions
C3-7, B4-4, C3-3	1.	Customer calls about faulty TV, problem discussed, and service charges communicated.
B5-4, A1-2	2.	Materials for house call determined and collected.
A5-6	3.	Travel to site.
C3-7, B5-4, B6-7	4.	Customer requested to operate set and briefly quizzed further about operating problem, plan of action determined.
B1-2, A4-1, B4-4	5.	Selecting proper tools, back of set opened, set turned on and interior inspected for obvious faults.
A1-1, A6-2, B1-4	6.	Tubes tested using tube tester.
B5-4, B1-7, C4-7	7.	Tubes test okay, request shop referral based on relative worth of set, range of costs, and ability to match selling technique to customer attitude.
A5-6	8.	Set transported to shop.
B1-2, A4-2	9.	Chasis removed from cabinet with proper tools and connected to shop power jig.
B1-2, A6-4	10.	Following manufacturers specifications, total system tested with proper equipment.
B1-2, A4-2	11.	Using necessary tools, faulty parts removed and replaced with new parts meeting specifications.
A4-2, A4-5	12.	Set reassembled in cabinet and final adjustments made.
B4-4, B3-7	13.	Cost is determined based on labor and parts.

No. 16

Home call resulting in TV repair in shop Cont'd

C3-2, C8-7	14. Customer called, agreement reached on billing, and appointment made for return of TV.
A1-1, A5-6, A4-5	15. TV delivered to customer and fine operating adjustments made to set.
B2-7	16. Customer billing entered into books at shop.

No. 17

Pucilaski

Hamreus
8-18-66

TASK DESCRIPTION

Job Title: TV-Radio repairman

Task Name: General TV service repair

Object Acted Upon: TV set-tuner

Information Guiding Action: Customer complaint, test, recall, reference manuals

Tools: Bench tools, soldering iron

Actions: Procedural act - exploratory

Worker Function-Process	Description of Task Actions
C3-3, C3-7	1. Customer repair call received, problem discussed and service charges communicated.
B5-4, A1-2	2. Materials for house call determined and collected.
A5-6	3. Transportation to site.
C3-7	4. Customer requested to operate set to demonstrate problem and to give additional information.
B5-7, B6-7	5. Analyze operating characteristics to infer fault and determine plan of repair.
C4-7	6. Convince customer of need to make shop repairs.
B3-7, C8-7	7. Determine estimate cost of repair and reach agreement with customer.
B1-2, B2-3	8. Before moving set, TV cabinet checked for damage and recorded on customer job order.
A5-6	9. Set transported to shop.
B5-4, A1-2	10. Reference manuals matching model and serial number of set identified and gathered.
B1-2, A4-2	11. Back of set removed and set energized.
A5-5, B1-4	12. Exploratory testing of all systems conducted to check adequacy of total operation.
B4-4, C3-2, C8-7	13. Set found to be more faulty than previously judged contact customer and establish new cost estimate.
B1-2, A4-2	14. With proper tools remove chassis from cabinet, and disassemble faulty tuner.

No. 17

General TV service repair Cont'd

A4-5, B1-2	15. Clean and adjust faulty tuner to specified levels.
A4-2	16. Assemble tuner in set, clean interior and replace chassis in cabinet.
A4-2, B5-5	17. Energize set and analyze for proper operating quality.
B4-7, B3-7	18. Estimate and write up customer bill.
A5-6	19. Deliver TV to customer
A4-2, C3-7	20. Demonstrate operation of set to customer communicating details of repair.
C8-7	21. Reach agreement with customer for billing.
C4-7	22. Literature left with customer advertising newer TV and other electronic products.
B2-1, B5-4	23. Customer placed on mailing list with comments concerning possible sales.

No. 18
Pucilasli
Hamr us
8-18-66

TASK DESCRIPTION

Job Title: TV-Radio repairman

Task Name: Diagnose and repair radio deficiency

Object Acted Upon: Transister radio

Information Guiding Action: Customer interrogation, recall, radio reference manual.

Tools: Shop tools, soldering iron.

Actions: Exploratory, procedural actions

Worker Function-Process	Description of Task Actions
C3-7	1. Customer enters shop with defective transistor radio and is requested to describe faulty operating history.
B5-2, C3-2	2. Tentative diagnosis made, service charges explained and repair agreement reached with customer.
B1-2, A1-1, A4-5 A6-5, B1-4	3. After opening set, check made with appropriate equipment to detect breaks, and low battery voltage.
B1-4, A1-2, A4-1, A4-5	4. According to specifications, all parts needing replacement are procured and replaced and all identified faults repaired.
A6-5, A4-4, B1-7	5. Set tested for performance, if trouble still remains, schematic consulted to determine path of signal.
A6-5, B1-7	6. Path of signal systematically tested with appropriate meters and equipment.
B1-2	7. When signal fault located, component(s) required for repair identified in manual.
B4-5, B5-7	8. Relative value of replacing faulty parts estimated and decision made whether or not to repair.
C3-7, C8-7	9. When customer returns, repair activities explained and billing agreements reached.

No. 19
Beard
9-13-66

Castle Electric Co.

TASK DESCRIPTION

Job Title: Electrician

Task Name: Installation of Florescent type fixtures

Object Acted Upon: Florescent fixtures

Information Guiding Action: Customer work order, recall

Tools: General electrician tools

Actions: Prescribed Plan

Worker Function-Process	Description of Task Action
C3-2	1. Receive verbal work order from supervisor.
B5-4, B3-5	2. Determine materials needed for job.
B1-2, A1-1	3. Procure and load fixtures and equipment in truck.
A5-6	4. Travel to installation location.
C3-2	5. Check with customer to confirm work order.
B5-7, B6-8	6. Determine installation plan of action.
A1-1	7. Bring in equipment and materials.
B1-2, A4-2	8. With proper tools, remove old fixtures, cut off power, clip excess electrical wire, and cover unused lines with wire nuts.
B3-3	9. Determine location of switches.
A4-2	10. Secure new fixtures in ceiling outlet boxes.
B5-2, A4-2	11. Remove desired knock-out panels from fixtures and thread electrical wiring through holes.
B4-5, A4-2, B1-2, A4-5	12. Align fixtures on ceiling, fasten together with chase nipple bolts, and with proper tools connect each fixture onto the main power line.
A4-2	13. Insert lamps and install fixture covers.
B1-4	14. With power on, check fixtures for proper operation.
C7-7	15. Instruct customer in operation of fixtures.
B3-7, B2-3, C3-2	16. Record work time and materials used and deliver to supervisor.

No. 20
Beard
9-9-66

Dick Lyman
Cascade Printing Co.

TASK DESCRIPTION

Job Title: Printer

Task Name: Hand/machine composition of blank business form

Object Acted Upon: Printing machines, paper cutter & various printing type

Information Guiding Action: Instructions covered in customer "layout," recall

Tools: Printing equipment

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
C3-2	1. Meet with supervisor to understand layout of customer's request.
B5-7, B6-7	2. Analyze layout to determine work plan.
B1-2, A1-2	3. Procure necessary materials for job.
B4-2, A6-5, B1-2, A6-2	4. Produce sufficient blank strips from strip casting machine, cut to desired size with lead saw.
B1-2, A8-2, A6-2	5. Set up broach machine according to job specifications and notch blank strips.
B1-2, A4-5, A4-2	6. With precise measurements, place vertical strips and monotabular rule stock in galley according to layout specifications.
B1-2, A8-2	7. Adjust linotype machine for lettering specifications.
A6-2, B4-2	8. Operate linotype machine and produce type needed for layout.
B1-2, A6-2, A4-5	9. Cut type to desired lengths and insert in gallery according to specifications.
B1-4, A4-5, B1-2	10. Insert special pre-developed type in galley to meet specifications.
B1-4, A4-5	11. Check final alignment of galley and tie type form with string.
A4-1, A4-5	12. Remove type from galley, place in proof press, and ink.
A6-2	13. Operate press to produce several proof copies.

No. 20

Hand/machine composition of blank business form Cont'd

B5-7, A8-4	14. Proof copies check for accuracy and adjustments made to meet specifications.
A4-2	15. Type form removed from press and placed in galley file for running for pressman.
B4-5, B2-3, C3-2	16. Time and effort and materials required for job recorded and given to supervisor.

No. 21

Control Data
Computer Corp.

Beard
9-28-66

TASK DESCRIPTION

Job Title: Computer Systems Technician -- Customer Engineer

Task Name: Trouble shoot problem on 501 Printer

Object Acted Upon: 501 Printer

Information Guiding Action: Operators report on the Equipment operation report, recall, reference manuals

Tools: Multitester, gauge, hand tools

Action: Procedural plans

Worker Function-Process		Description of Task Actions
C3-7, B4-2	1.	In response to call of equipment breakdown, discuss nature of difficulty with operator.
B5-4, B6-7	2.	Problem analyzed and plan of action determined.
B1-2, A4-2, B1-2	3.	Back panel of 501 printer removed and visual inspection made to detect defective parts.
A6-2, B1-4	4.	Multitester used to check total system according to specifications.
B6-2, A4-2, B1-2	5.	Defective parts removed and replacements secured from stock.
A4-2, B1-2	6.	Replacement parts inserted according to specification; if parts are not in stock, temporary repairs are made.
A6-2, B5-4	7.	501 printer test operated to check adequacy of repair.
A4-2	8.	Back panel replaced.
C3-2, C7-7	9.	Customer informed of repair and instructed in any particular corrective operating procedures.
B4-5, B2-3	10.	Reports completed of time, effort and materials used.

No. 22
Beard
9-28-66

Control Data
Computer Corp.

TASK DESCRIPTION

Job Title: Computer Systems Technician -- Customer Engineer

Task Name: Weekly maintenance -- Preventive type.

Object Acted Upon: 604 Tape Transports

Information Guiding Actions: Instruction Maintenance Manual

Tools: Multi-tester, gauges, hand tools

Actions: Plan of Procedure

Worker Function-Process	Description of Task Actions
B4-2	1. Check specification manuals to recall maintenance procedure for 604 tape transport.
A4-4	2. Clean fault ports, vacuum inlet screens, photocell and lamp lense and neoprene expansion rings.
A6-2, B4-2, B1-4, A4-4	3. Energize tape unit and read operational vacuums and pressures; adjust mechanisms to meet specifications.
A4-2, A4-5, B5-4	4. With power on and tape loaded, manually sequence all supply and take up reel operations and observe for proper fault indicator light occurance.
B1-2, A4-2, A6-5 B1-4	5. With oscilloscope attached, start and stop time tolerance forward and reverse reel functions tested.
A4-5, B1-4	6. Necessary adjustments made to reach start-stop time tolerance.
B1-4, A6-5, B1-4, A4-2	7. With oscilloscope attached and syncronized for interval, all photocell amplifier voltages tested to meet specification levels. Faulty parts replaced.
B1-4, A4-2	8. All read/write heads inspected for scratches and tape cleaners for damage to blades, replacing bad ones.
B2-3	9. Record of weekly maintenance completed.

No. 23
Morse
9-28-66

Bob Klempel
Valley Welding

TASK DESCRIPTION

Job Title: General Welding and Repair

Task Name: Metallizing

Object Acted Upon: Electric Motor, Rotor Shaft.

Information Guiding Action: Recall, Direction book, manual

Tools: Lathe, metallizing gun, air compressor with at least 60 lbs. pressure per cu. ft.

Actions: Plan of procedure following direction manual

Worker Function-Process	Description of Task Actions
C3-7	1. Meet with customer to understand job to be accomplished.
B1-4, B5-5	2. Compare customer rotor with standard, analyze amount of metallizing.
B4-2, B3-7, C3-2 C8-7	3. Estimate cost of job and reach agreement with customer.
B6-7	4. Determine plan of action.
A8-5	5. Center rotor in lathe set-up.
B1-2, A8-5	6. Select appropriate lathe cutting tools and adjust for cutting.
A6-5, B1-4	7. Turn down diameter of shaft to below standard.
B1-2, A8-5, A6-5	8. Selecting appropriate cutting tool, score shaft with rough threads to prepare for metallizing.
B1-4, A4-2, A6-5	9. Heat rotor with acetylene torch.
B1-2, A4-2	10. Metallizing gun connected to compressed air hose and set to spray according to specification manual.
A6-5, A4-2	11. Metal sprayed on rotor area until diameter of shaft exceeds standard.
B1-4, A8-5, A6-5, A7-5, B3-7	12. After metal has cooled, turn down shaft with proper cutting tool until specified diameter is measured with micrometer.
A4-5, B1-4	13. Shaft is polished with proper abrasive.
B4-2, B3-7	14. Job cost is calculated in terms of time and materials required.

C3-2, C8-7 15. Agreement reached with customer for billing.

No. 24

Bob Klempel
Valley Welding

Morse
9-28-66

TASK DESCRIPTION

Job Title: General Welding

Task Name: Fabrication

Object Acted Upon: Metal to be fabricated

Information Guiding action: Recall, customer specs. blueprint manuals

Tools: Acetylene torch, arc welder, hand tools.

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
C3-7	1. Meet with customer to understand job.
B5-2, B3-7, B6-7	2. Analyze customer blueprint and specifications to determine materials needed and plan fabrication plans.
B1-2, A1-2, B5-5	3. Materials obtained and assembled for easiest handling.
B3-7, A7-5	4. Dimensions layed out on metal sheets for cutting.
B1-2, A6-5, B1-4	5. Proper tip and acetylene torch selected, ignited, and adjusted for cutting.
A6-5, B1-4	6. All pieces cut to size.
B1-2, A4-5, B1-4	7. Pieces to be attached are clamped into position and refined fitting is accomplished with abrasive tools to meet specification.
B1-2, A4-2	8. Welding electrode and rods are selected and the welding machine adjusted for type metal to be welded.
A6-6, B1-4, B5-4, A4-5	9. Spot welds applied to join edges at specified distances, accompanied by clamping and/or pounding if needed to maintain proper alignment.
B5-4, A6-6	10. When all spot welds completed and metal shape in alignment, seam welds are completed.
A6-5, B1-4	11. All welded spots tested for strength.
A1-2, B1-4	12. All welds cleaned.
B4-2, B3-7	13. Estimate of cost for job made.
C3-2, C8-7	14. Agreement reached with customer for billing.

No. 25
Morse
9-28-66

Al Burlebach
Dallas Welding and Boiler Shop

TASK DESCRIPTION

Job Title: Welding and Repair

Task Name: Boiler Repair, water tube type

Object Acted Upon: Water tube boiler

Information Guiding Action: Recall

Tools: tube rollers, acetylene torch, hand tools

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
C3-7, B4-2	1. Call received from customer identifying leaky water tubes in boiler, problem discussed for information.
B1-2, A1-2, A5-6	2. Materials for repair call determined and collected.
A5-6	3. Travel to site.
A1-2, B5-7	4. Enter firebox and smoke box of boiler to determine extent of damage.
B6-7	5. Determine plan of action.
B1-2, A6-2, B1-4	6. Cutting torch assembled, ignited, and adjusted for cutting water tubes.
A6-5, A1-2	7. Bad water tubes cut inside the boiler, from both ends, and removed.
A7-5, A1-2, B1-4	8. Small end pieces of water tubes cut out of metal end walls (boiler headers) and removed with clamping pliers.
B1-2, A6-5, A4-2	9. New tubes are selected, cut to size, and inserted into vacated channels.
B1-2, A6-5, B5-4	10. Tube rollers are inserted into new tubes and manipulated to expand ends to connect to boiler headers.
B1-2, A4-5, B1-4	11. Ends of tubes are beaded with appropriate hammers, to insure leakproof joints to boiler headers.
A4-2, B5-4	12. Boiler filled with water and tubes checked for leaks.
B4-2, B3-7	13. Labor and materials compiled and repair cost estimated.

No. 26
Morse
9-28-66

Al Burlebach
Dallas Welding and Boiler Shop

TASK DESCRIPTION

Job Title: General Welding

Task Name: Fabricating

Object Acted Upon: Metal for fabrication

Information Guiding Action: Recall, blueprint, customer specs, manuals

Tools: acetylene torch, arc welding apperatus, hand tools, compass divider, ruler

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
C3-7	1. Meet with customer to receive blueprints and understand nature of the job.
B5-7	2. Analyze blueprints and specifications to determine materials needed and plan the job.
B6-7, B1-2	3. After selecting specified metal sheets, lay out work using appropriate tools.
B1-2, A6-4, A6-5	4. Select appropriate flame cutting equipment, ignite and adjust and cut metal pieces to proper size.
B1-4, A6-5, B1-2	5. Drill necessary holes according to specification, selecting proper drills and bits.
B1-2, A4-2, A4-5	6. Parts for fabrication are assembled and clamped into position, making allowances for effects of heat, welding shrinkage, and physical properties of metal.
A4-2, B1-2, A1-2	7. Arc welding equipment set for proper amperage and specified electrode selected to correctly weld type of metal used.
A6-6, B4-4, A4-5	8. Spot welds made along seams to be joined at specified points, readjusting, by clamp or other methods, parts to be joined to assure alignment.
A6-6	9. Make continuous welds to close all seam joints.
A4-1, B1-4	10. Clean weld and surrounding areas with grinder, scraper, and chipper.
B4-2	11. Compile and record time of labor and materials used.
B3-7, B2-3	12. Estimate cost of job made and billing prepared for customer.

No. 27
Beard
8-19-66

E. F. MacDonald
Executive Secretary

TASK DESCRIPTION

Job Title: Executive Secretary

Task Name: Handling correspondence

Object Acted Upon: Correspondence

Information Guiding Action: Job description, high level judgments

Tools: Typewriter, letter opener, shorthand notebook, reference material.

Actions: Plan of procedure

Worker Function-Process	Description of Task Actions
A4-1, B4-2	1. All mail addressed to the office opened and read.
B2-2	2. All mail logged with date and name of originator.
B2-7, B2-2	3. Resume prepared for each peice of correspondence and posted in log book.
B5-4, B6-7	4. Routing decided for all correspondence.
B2-7, A6-5	5. Answers to routine correspondence drafted, typed and signed.
A1-2	6. Reading copy of correspondence filed.
B1-7, B4-7, A6-5 A1-1	7. Using available references, answers to detailed or complex items of correspondence are formulated, typed in final form, and delivered to agency head for approval.
A1-2	8. Reading copy of correspondence filed.
C3-2, A1-2	9. Correspondence requiring professional staff attention delivered to Project Chiefs.
B5-2, B6-2, A1-2, C3-2	10. Rough draft from Project Chiefs edited for writing errors and assigned to general secretaries for typing.
B5-7, A1-2	11. Final form from secretaries judged for accuracy and quality, and delivered to Project Chiefs for signature.
A1-2	12. Reading copy filed.
C3-2, A1-2	13. Correspondence that requires personal action of agency head delivered.
B4-2, B2-3	14. Dictation taken by shorthand from agency head.

No. 27

Handling correspondence Cont'd

A6-5, B2-3, A1-2	15. Dictation typed and given to agency head for signature.
A1-2	16. Reading copy filed.
A4-2	17. Correspondence prepared for mailing.

APPENDIX H

Classification Loadings

Appendix H

Table H-1

Classification Loadings for 27 Basic Tasks

Basic Task 1

A. 12, 75, 75, 85
B. 14, 14, 23, 37, 37, 37, 38, 42, 43, 43, 43, 44, 44, 47, 47, 48, 54, 57, 57, 57, 57, 58, 68, 68, 69, 69
C. 32, 33

Basic Task 2

A. 12, 75, 75, 85
B. 23, 37, 37, 37, 43, 43, 44, 47, 52, 54, 57, 67, 68
C. 32, 38

Basic Task 3

A. 12, 75, 75, 85
B. 23, 37, 37, 37, 42, 42, 43, 43, 43, 44, 44, 47 53, 54, 54, 57, 67, 67, 67, 68
C. 32,32

Basic Task 4

A. 12, 75, 75, 75, 75, 85
B. 22, 23, 37, 42, 43, 43, 44, 47, 57, 57, 57, 57, 57, 67, 68, 68, 68
C. 32, 32

Basic Task 5

A. 12, 45, 45, 45, 45, 45, 45, 45, 52, 52, 62
B. 12, 12, 12, 12, 14, 14, 14, 14, 14, 14, 14, 23, 37, 43, 44, 47, 54
C. -

Basic Task 6

A. 12, 12, 12, 12, 12, 12, 45, 45, 45, 45, 45, 45, 45, 45, 52, 65
B. 12, 12, 12, 12, 12, 14, 14, 14, 14, 14, 23, 42, 44, 54, 57, 57, 67
C. -

Table H-1 (Cont.)

Basic Task 7

A. 12, 12, 12, 12, 12, 12, 14, 41, 41, 42, 42, 43, 45, 45, 45, 45, 45, 45, 45, 45, 45, 45, 45, 45, 45, 45, 56, 56, 65, 65, 65, 65, 65, 65,
B. 12, 12, 12, 12, 12, 12, 12, 12, 12, 12, 12, 12, 12, 12, 12, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14, 15, 22, 22, 23, 23, 37, 37, 41, 42, 42, 43, 43, 44, 44, 44, 44, 47, 57, 67
C. 32, 32, 33, 87, 87

Basic Task 8

A. 12, 12, 12, 12, 12, 12, 12, 45, 45, 45, 45, 45, 45, 45, 45, 45, 56, 65, 65
B. 12, 12, 12, 12, 12, 12, 12, 14, 14, 14, 14, 14, 23, 37, 37, 43, 44, 47, 67
C. 32, 33, 33, 33, 38, 38

Basic Task 9

A. 12, 12, 12, 12, 12, 12, 12, 12, 45, 45, 45, 45, 45, 45, 45, 45, 45, 45, 45, 52, 52, 62, 62, 62, 62, 65
B. 12, 12, 12, 12, 12, 12, 12, 12, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14, 23, 37, 37, 43, 44, 44, 44, 44, 47, 57
C. 32, 32, 32, 33, 87, 88

Basic Task 10

A. 12, 12, 12, 12, 14, 42, 42, 42, 44, 44, 45, 45, 45, 45, 45, 52, 65, 65, 65, 65
B. 12, 12, 12, 12, 12, 12, 12, 14, 14, 14, 23, 37, 37, 43, 44, 44, 44, 47, 57
C. 32, 33, 33, 88, 88

Basic Task 11

A. 12, 12, 12, 12, 45, 45, 45, 45, 45, 45, 45, 52, 52, 65
B. 12, 12, 12, 12, 12, 12, 12, 12, 14, 14, 14, 14, 14, 14, 23, 37, 43, 47, 54, 57
C. 32

Table H-1 (Cont.)

Basic Task 12

A. 12, 42, 42, 42, 42, 42, 42, 42, 45, 52, 65
B. 12, 12, 12, 12, 12, 12, 12, 12, 12, 14, 14, 14, 23, 43, 44, 44, 47, 57,57
C. 32

Basic Task 13

A. 12, 12, 12, 12, 14, 45, 45, 45, 45, 66
B. 12, 12, 12, 12, 12, 14, 14, 14, 14, 14, 14, 42, 44, 52, 52, 54, 54, 67, 67, 67
C. 33

Basic Task 14

A. 12, 12, 12, 42, 42, 45, 45, 52, 64, 65, 66, 66
B. 12, 12, 12, 12, 12, 12, 14, 14, 14, 14, 23, 37, 43, 44, 44, 47, 57
C. 32, 33, 38, 88

Basic Task 15

A. 12, 12, 45, 65, 65, 65, 66
B. 12, 12, 12, 12, 14, 14, 14, 14, 23, 37, 42, 43, 44, 54, 57, 58, 58
C. 32, 33, 33, 88

Basic Task 16

A. 11, 12, 41, 42, 42, 45, 56, 56, 62, 64
B. 12, 12, 14, 17, 27, 37, 44, 44, 54, 54, 67
C. 32, 33, 37, 47, 87

Basic Task 17

A. 12, 42, 42, 42, 45, 55, 56, 56
B. 12, 12, 14, 21, 23, 37, 44, 47, 54, 54, 55, 57, 67
C. 32, 33, 37, 37, 47, 87, 87

Table H-1 (Cont.)

Basic Task 18

A. 11, 12, 41, 44, 45, 65, 65
B. 12, 14, 17, 45, 52, 57
C. 32, 37, 87

Basic Task 19

A. 11, 42, 42, 42, 45, 56
B. 12, 12, 14, 23, 33, 35, 37, 45, 52, 54, 57, 68
C. 32, 32, 77

Basic Task 20

A. 12, 41, 42, 45, 45, 45, 62, 62, 65, 65, 82, 84
B. 12, 12, 12, 12, 14, 23, 42, 42, 57, 67
C. 32

Basic Task 21

A. 42, 42, 62
B. 12, 12, 14, 23, 42, 45, 54, 62, 67
C. 32, 37, 77

Basic Task 22

A. 42, 42, 44, 45, 62, 65
B. 12, 14, 14, 14, 23, 42, 54
C. -

Basic Task 23

A. 42, 45, 65, 65, 65, 76, 85, 85
B. 12, 12, 14, 14, 14, 37, 37, 42, 55, 67
C. 32, 37, 87

Basic Task 24

A. 12, 42, 45, 65, 65, 66, 75
B. 12, 12, 14, 14, 14, 37, 37, 42, 52, 54, 55, 67
C. 32, 37, 87

Table H-1 (Cont.)

Basic Task 25

A. 12, 12, 42, 45, 62, 65, 65, 65, 75
B. 12, 12, 12, 14, 14, 37, 42, 54, 57, 67
C. 37

Basic Task 26

A. 12, 41, 42, 45, 64, 65, 66, 87
B. 12, 12, 14, 23, 37, 42, 44, 57, 67
C. 37

Basic Task 27

A. 11, 12, 12, 12, 12, 12, 41, 42, 65, 65
B. 17, 22, 23, 27, 42, 47, 52, 54, 57, 62, 67
C. 32, 32

Table H-2

Basic Task Classification Loadings for Functional Category of Things

Basic Task	Functional Category - Things (A)
1	12,75,85
2	12,75,85
3	12,75,85
4	12,75,75,85
5	12,45,45,45,45,52,62
6	12,12,12,45,45,45,45,52,65
7	12,12,12,14,41,42,43,45,45,45,45,45,45,45,56,65,65,65
8	12,12,12,12,45,45,45,45,45,56,65
9	12,12,12,12,45,45,45,45,45,45,52,62,65
10	12,12,14,42,42,44,45,45,45,52,65,65
11	12,12,45,45,45,45,52,65
12	12,42,42,42,42,45,52,65
13	12,12,14,45,45,66
14	12,12,12,42,42,45,45,52,64,65,66,66
15	12,12,45,65,65,65,66
16	11,12,41,42,42,45,56,56,62,64
17	12,42,42,42,45,55,56,56
18	11,12,41,44,45,65,65
19	11,42,42,42,45,56
20	12,41,42,45,45,45,62,62,65,65,82,84
21	42,42,62
22	42,42,44,45,62,65
23	42,45,65,65,65,75,85,85
24	12,42,45,65,65,66,75
25	12,12,42,45,62,65,65,65,75
26	12,41,42,42,45,64,65,66
27	11,12,12,12,12,12,41,42,65,65

Table H-3

Basic Task Classification Loadings for Functional Category of Data

Basic Task	Functional Category - Data (B)
1	14,23,37,37,38,42,43,43,44,47,48,54,57,57,58,68,69
2	23,37,37,43,44,47,52,54,57,67,68
3	23,37,37,42,43,43,44,47,53,54,57,67,67,68
4	22,23,37,42,43,44,47,57,57,57,67,68,68
5	12,12,14,14,14,14,23,37,43,44,47,54
6	12,12,12,14,14,14,23,42,44,54,57,67
7	12,12,12,12,12,12,12,12,14,14,14,14,14,14,15,22,23,37,41, 42,43,44,44,47,57,67
8	12,12,12,12,14,14,14,23,37,43,44,47,67
9	12,12,12,12,14,14,14,14,14,14,23,37,43,44,44,47,57
10	12,12,12,12,14,14,23,37,43,44,44,47,57
11	12,12,12,12,14,14,14,23,37,43,47,54,57
12	12,12,12,12,12,14,14,23,43,44,47,57
13	12,12,12,14,14,14,42,44,52,54,67,67
14	12,12,12,12,12,12,14,14,14,14,23,37,43,44,44,47,57
15	12,12,12,12,14,14,14,14,23,37,42,43,44,54,57,58,58
16	12,12,14,17,27,37,44,44,54,54,67
17	12,12,14,21,23,37,44,47,54,54,55,57,67
18	12,14,17,45,52,57
19	12,12,14,23,33,35,37,45,52,54,57,68
20	12,12,12,12,14,23,42,42,57,67
21	12,12,14,23,42,45,54,62,67
22	12,14,14,14,23,42,54
23	12,12,14,14,14,37,37,42,55,67
24	12,12,14,14,14,37,37,42,52,54,55,67
25	12,12,12,14,14,37,42,54,57,67
26	12,12,14,23,37,42,44,57,67
27	17,22,23,27,42,47,52,54,57,62,67

Table H-4

Basic Task Classification Loadings for Functional Category of People

Basic Task	Functional Category - People (C)
1	32,33
2	32,38
3	32
4	32
5	--
6	--
7	32,33,87
8	32,33,33,88
9	32,32,33,87,88
10	32,33,88
11	32
12	32
13	33
14	32,33,38,88
15	32,33,33,88
16	32,33,37,47,87
17	32,33,37,37,47,87,87
18	32,37,87
19	32,32,77
20	32
21	32,37,77
22	--
23	32,37,87
24	32,37,87
25	37
26	37
27	32,32

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Abstract:

The study reports the first of four phases to develop a systematic method of feedback for planning, implementing and evaluating vocational education programs. This first phase (1) developed data gathering instruments designed to continuously assess human resources, employment opportunities, and educational training programs; (2) developed a system for assessing job opportunities that cluster the common worker skills and mental processes required in the job; and (3) developed manuals of procedures for field personnel to administer the data gathering instruments and to employ the clustering system. Seven data gathering instruments were developed and field tested which included a questionnaire for students (pre- and post secondary, nonbaccalaureate bound), dropouts, employees (employed and unemployed), employers, secondary school vocational programs, community college vocational programs, and proprietary schools. A two-dimensional clustering system was developed which combined worker functions (what a worker does during the job) and worker processes (what mental processes a worker engages in while working). Task descriptions were developed for jobs drawn from occupational areas representing mechanical, electrical and symbolic skills. Numerical loadings for each basic task were generated from which clusters were formed. The clustering system has implications for use as a means of planning educational vocational curricula which prepare potential workers to meet the needs of several related jobs rather than a single job as is now the case. Guidelines in the methods of administering the data gathering instruments and employing the clustering system were prepared.

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